VETERINARY MEDICINE

MARCH 1939

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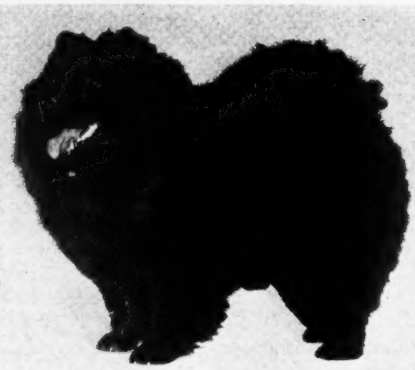

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The Veterinarian and Animal Husbandry

The veterinarian in his work can have a far-reaching influence on the conduct of animal breeding and rearing and in this way can increase the production of important foodstuffs for human beings. In the exercise of his calling, he acquires knowledge of the climate and soil of his own particular district and of the position of animal breeding in agricultural practice. He also gets to know the chief breeders of the neighborhood and their herds and aims in breeding. He sees the kinds of fodder plants cultivated and knows whether home-grown or bought feeding stuffs are available. He also takes note of the method of animal husbandry, the conditions of housing, the prevailing diseases, the important breeders' associations, any productivity tests that may be carried out, the maintenance of breeding sires, etc. In short, he understands the state of animal breeding and husbandry in his own district. He sees both the progress and the backwardness, and people consult him on the advantages and disadvantages of the existing breeding methods. He witnesses the economic results of high production and is called in for the treatment of animals of low productivity and those which are constitutionally weak.—*Valentin Stang,* in *Vet. Rec.,* 50:43.

* * * *

Before the medical profession settled the question as to whether tuberculosis is caused by hereditary influence, veterinarians had settled the question that it is a contagious disease.—*D. E. Salmon.*

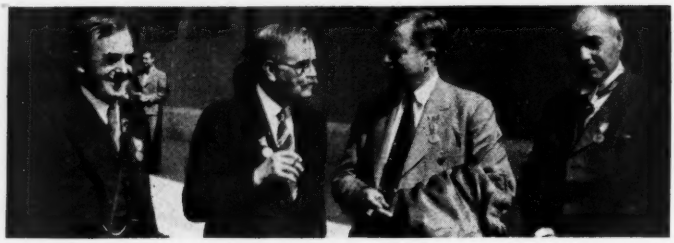
* * * *

While most veterinarians—perhaps all veterinarians—recognize the desirability of good relations with the public, too many see the problem as solely one for the profession as a whole to meet. They expect the A. V. M. A. or their state associations to solve it, failing to connect it with themselves and their own practices. A general solution of the problem of better public relations lies both in the national and state field and in purely local effort among one's patrons and fellow townsmen.

* * * *

The highest salaried veterinarian in Chicago in 1936, according to the official list of names of persons connected with corporations furnished to the Ways and Means Committee of the House of Representatives by the United States Treasury Department, received a remuneration of $106,319.92, comprising a salary of $88,699.92, commissions of $17,500 and a bonus of $120.

XIII International Veterinary Congress



When the XIII International Veterinary Congress moved its sessions from Zurich to Interlaken, Switzerland, August 25, 1938, most of the members traveled via Berne, where they stopped for several hours to visit interesting places in that very interesting city. The candid photograph shown above was "snapped" on the grounds of the veterinary college in Berne by Lt. W. Fechner of Tuscaloosa, Ala. From left to right the figures in the foreground are Dr. J. Russell Greig, Director of the Moredun Institute of Animal Diseases Research Association at Edinburgh, Scotland, Prof. Sir Frederick Hobday, retired Principal of the Royal Veterinary College, London, D. M. Campbell, Chicago, and Prof. Halfdan Holth, Oslo, Norway.

Scots Entertain American Veterinarians

Maj. J. Gilray McGregor

When the party of American veterinarians led by Doctor Campbell reached Edinburgh, enroute to the XIII International Veterinary Congress, they were given a luncheon at the Royal (Dick) Veterinary College by the Scottish Branch of the National Veterinary Medical Association of Great Britain and Ireland. In addition to numbers of the Scottish Branch and their wives and the faculty of the College, and their wives, the luncheon was attended by Capt. and Mrs. Donald Campbell, President of the National Association. Major McGregor, President of the Scottish Branch, presided, and in the course of a cordial welcome to the American guests said:

"Today you are visiting the shrines associated with the early years of many of the men who founded the veterinary profession in North America. As Scotsmen we are proud of the part which our ancestors played in carrying the torch of education abroad, but we would like also to acknowledge the debt which the profession in Scotland owes to North America. We have exported veterinary college principals in the past, but the circle has now been completed and we have imported a college principal from North America. In Dr. A. W. Whitehouse, the successful principal of the Glasgow Veterinary College, we have the truth exemplified of the reward that comes from casting our bread upon the waters. In sending Doctor Whitehouse to us you have repaid in full your obligation for veterinary principals that we furnished in years gone by for American veterinary colleges."

* * * *

NOTE—Through an oversight credit was not given the International Veterinary Congress for the discussion on "X-ray Diagnosis in Small Animals" by Dr. Gerry B. Schnelle, published in February (pp. 112-119). Nor was the illustration on page 116 credited to Dr. E. F. Schroeder as it should have been. As indicated in the legends the illustrations were not a part of the paper as presented to the Congress.

Vaccination Against Equine Encephalomyelitis

Equine encephalomyelitis has received a tremendous amount, we think an unwarranted amount, of newspaper and radio publicity; much of it unfortunate in its sensationalism. The objective of the publicity was to arouse horse owners to the hazard they faced and induce them to take measures for the protection of their animals. The result in too many instances was to scare them into exchanging their horses for tractors—in giving an unwarranted and unintended fright.

It is difficult to keep newspaper headlines in accord with scientific facts. They are more conspicuous if they are made taller than the facts warrant. During the encephalomyelitis outbreak last season various public officials thundered in newspaper headlines and over the radio, "There is no cure for sleeping sickness." The intention was to protect farmers from being duped by fakers and medicine peddlers. This was a wholly laudable purpose, but too many farmers read no further than the headlines or listened no further than the announcement, and concluded that it is not worth while to treat the disease. "Why call a veterinarian for a disease that can't be cured?" was their reasoning. Every veterinarian practicing in localities where the disease was severe can recite instance after instance of the loss of good horses where the prospects of recovery would have been excellent had the animals received proper treatment.

A great deal of informative discussion of encephalomyelitis has appeared in veterinary literature during the past five years. Veterinarians everywhere are fully familiar with what is known concerning it and are capable of handling the situation. A continuation of the newspaper and radio campaign of public education is unnecessary. In the chick-embryo vaccine and his knowledge of local conditions the veterinary practitioner has the answer to the problem. And no one has the answer who does not possess both the vaccine and the information as to local conditions.

Farmers' organizations have shown a keen interest of recent months in the price that will be charged for vaccination next spring and summer, and some of them have asked for bids on large quantities of the vaccine from certain firms that cater to the laity in the sale of biologic products for use upon animals. However, as yet no one knows what the cost of the vaccine will be. There is assurance that the price will be lower than last year, but how much lower depends upon circumstances not yet determined.

Naturally, the cost of vaccination varies materially on different farms. Where this work is carefully planned and horse owners coöperate fully by having their animals ready and easily accessible at a definite time, in most localities a veterinarian can immunize a far greater number of animals in a given time than if a call has to be made for each farm or small group of farms, or if the animals are in the field or out in the pasture when the veterinarian arrives. It will be not only the exercise of good judgment but good business as well to plan this work carefully and keep the cost moderate.

It is scarcely necessary to mention if the immunization of horses against encephalomyelitis is to remain in professional hands it must be performed in a professional manner. Nearly every horse owner will be informed as to the cost of doing the work himself and it will be difficult to persuade him that he should pay more to some one else for the same kind of a job, that he himself would do.

Several of the state veterinary associations have appointed committees of practitioners to study the whole subject and make recommendations for the guidance of their members. These recommendations will include planning, execution, price, terms, etc. Last year the prices charged varied widely and this sometimes left a bad impression on horse owners. It is thought the work of these committees will result in greater uniformity in the charges for vaccination this year.

Above: Front view of the veterinary office and small animal hospital of Dr. N. D. Backus, Elyria, Ohio, the newly-elected president of the Ohio V. M. A.

Left: Doctor Backus in his private office which opens into the front office where his assistant Doctor Manthei is sitting.

Doctor Backus was graduated from the New York State Veterinary College at Cornell University in 1905, and practiced in Elyria till 1920, when he was elected county sheriff and later county treasurer. After retiring from politics he was engaged in banking for a few years, but returned to practice in 1934 and erected the hospital shown above, which he finds adequate for a general practice in a city of 30,000 population.

New Treatment for Gapeworms

Although gapeworms are common poultry parasites and cause extensive losses to the poultry industry, there has been until recently no satisfactory medicinal treatment for removing them from the trachea or windpipe of young chicks.

During the past year three Bureau of Animal Industry zoölogists — Everett E. Wehr, Paul D. Harwood and Jacob M. Schaffer—found that infested chicks treated by inhaling barium antimonyl tartrate dust are able to dislodge the parasites.

The barium antimonyl tartrate, which is not yet available commercially, is made by combining tatar emetic and barium chloride. The Bureau has applied for a patent which will give the public free use of the product.

In laboratory tests, the Bureau scientists infected two-week-old chicks with eggs and larvæ of the gapeworm. The birds were kept for another two weeks under conditions preventing other parasitic infection. By this time a large number of the chicks were coughing or gaping.

Three to five of the infected chicks were then placed in a large glass jar. A small amount of the dust was placed on their heads and the remainder sprinkled into the jar which was then covered with a cloth. The dust was agitated by air pressure so that the chicks would inhale it. Ten minutes in the jar was sufficient to kill the parasites. A few hours after treatment, the infected chicks ceased coughing and gaping.

Post-mortem examination of the treated chicks' throats showed that the barium antimonyl tartrate dust was more than 98% efficient in killing the parasites. Other chemical dusts were tried, but none was so effective.

Since the original tests were run, 50 to 55 chicks have been treated at a time by placing them in a large galvanized box—a little more than two feet square and 18 inches high—and introducing the dust with a blow gun.

Dean Newsom

I. E. Newsom, dean of the Division of Veterinary Medicine of the Colorado State College, Ft. Collins, is incapacitated at present with a heart involvement (coronary occlusion). R. F. Bourne is acting dean of the school.

* * * *

Veterinarian Dies at State Meeting

Dr. Foster F. Parker, aged 63, Des Moines, Ia., died suddenly Jan. 19, 1939, of a heart attack at the dance following the banquet at the 51st annual meeting of the Iowa Veterinary Medical Association in Des Moines.

Dr. F. F. Parker

Doctor Parker was graduated from the Veterinary Division of the Iowa State College at Ames in 1900. During his senior year he was head football coach of the college. He practiced in Oskaloosa, Ia., till 1917, when he moved to Des Moines, where he has operated a small animal hospital since 1924. He was a former president of the Iowa V. M. A. and of the National Livestock Insurance Company. His widow, two sons, and a daughter survive him.

Dr. W. B. Niles, Pioneer in Hog-Cholera Control, Dies

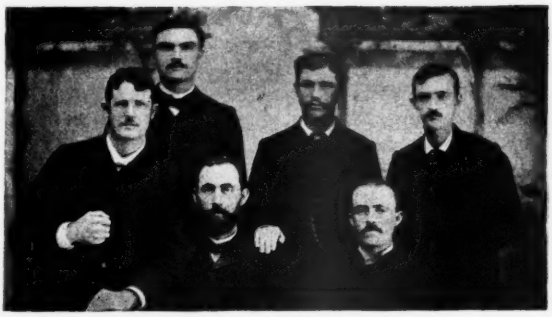
Dr. W. B. Niles, formerly of the Bureau of Animal Industry, U. S. Department of Agriculture, and widely known for his participation in the successful development of serum for combating hog cholera, died January 23 at his home in Covina, Calif. He was 80 years old.

Born in Rock County, Wisconsin, Doctor Niles was reared on a farm. In 1870 he moved to Iowa with his parents. There he pursued a veterinary course at Iowa State College and graduated as an honor student in 1885. The following year he served as assistant State veterinarian, later entered private practice, and in 1887 accepted a professorship of veterinary science at the University of South Carolina.

Following other veterinary activities, including teaching at Iowa State College, Doctor Niles entered the service of the U. S. Bureau of Animal Industry in 1898, where he became associated with Dr. M. Dorset and Dr. C. N. McBryde in their investigation of hog cholera for which, at the time, no adequate control measures were known. The research activities of the three investigators resulted in the discovery and development of the preventive-serum treatment now widely used in controlling hog-cholera losses.

Doctor Niles made other contributions to veterinary science with resulting benefits to the live stock industry. He retired from the Federal service in 1930.

A FAMOUS CLASS IN AMERICAN VETERINARY HISTORY

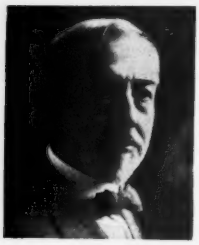


The class of 1885, Division of Veterinary Medicine, Iowa State College, included: Sesco Stewart, M. D., secretary (1895-1902) and president (1902-03), A. V. M. A., Dean of Kansas City Veterinary College 1893-1918; W. B. Niles (standing, right), co-discoverer of anti-hog cholera serum; E. E. Sayers; Geo. H. Glover, president A. V. M. A. 1910-11, Dean of the Veterinary Division of Colorado State College, 1907-34; D. C. Collins, and M. E. Johnson.

Tait Butler Succumbs to Long Illness

Dr. Tait Butler, aged 76, died at his home in Memphis, Tennessee, January 13th, after a six-month period of ill health.

Tait Butler, a native of Ontario, Canada, was graduated from the Ontario Veterinary College in 1885, receiving the following awards: Gold medal for best general examination, first prizes in physiology, materia medica and anatomy, and second prize in pathology.



Soon after graduation, Doctor Butler began general practice in Davenport, Iowa, and was one of the organizers of the Iowa Veterinary Medical Association, serving that association as secretary in 1888-89 and as president in 1889-90. In 1891, he was appointed to the position of Professor of Veterinary Science in the Agricultural College of Mississippi and veterinarian for the Mississippi Agricultural Experiment Station. While in Mississippi, he founded and was editor and publisher of the *Southern Farm Gazette* of Starkville. In 1895 he became Professor of Veterinary Science and Bacteriology at the Kansas State Agricultural College and state veterinarian. In 1900, he served a short period in the Federal Bureau of Animal Industry, being stationed at Milwaukee and Indianapolis but before the close of the year accepted the positions of Professor of Veterinary Science and Zoölogy in the North Carolina College of Agriculture and state veterinarian of North Carolina; also director of the Farmers Institutes of North Carolina. In 1909 he resigned these positions to accept that of editor of the *Progressive Farmer* of Memphis, Tennessee, in which capacity he continued until his death. He was also vice-president of the Progressive Farmer Company of Birmingham, Alabama, Raleigh, N. Car., Memphis, Tenn., and Dallas, Texas.

He was president of the American Veterinary Medical Association 1900-01; president of the Tennessee Cotton Growers' Cooperative Marketing Association 1926-29; secretary and later president of the Southern Cattlemen's Association and director of the American Cotton Growers' Exchange. In 1934 he was awarded a medal for distinguished service to organized agriculture by the American Farm Bureau Federation. Emphatically he was the South's "Grand Old Man of Agriculture." In 1932 leaders from all over the South urged his appointment to the portfolio of Secretary of the U. S. Department of Agriculture. He was often referred to as "the man whom a million persons call 'friend'."

Although for 30 years editor of a leading farm weekly of the south and with his principal interests in agriculture, Doctor Butler retained his interest in veterinary medicine and was a fairly regular attendant at meetings of the A.V.M.A. and the U. S. Live Stock Sanitary Association. Perhaps his most outstanding work in the veterinary profession was as a member of the Committee on Veterinary Colleges appointed by the Secretary of the U. S. Department of Agriculture in 1907. In commemoration of having been president Doctor Butler was awarded a gold key and certificate at the Diamond Jubilee meeting of the national association in New York last summer.

He was but 38 years of age and 16 years in the veterinary profession when he was elected president of the A.V.M.A., but his presidential address made at Atlantic City in 1901 showed a wide grasp of veterinary problems. In this address he recommended that for its meetings the association be divided into sections, one on general practice, one on hygiene, sanitation and state medicine and one on research. After many years this recommendation was adopted. He appointed the first "press committee" for an A.V.M.A. meeting, "Because the association has not obtained the publicity for its proceedings which would render its meeting most effective for good, and it is especially desirable to avoid all the trouble of past years which has resulted from erro-

neous and false statements in regard to our proceedings." He urged upon the association that it strive to place a veterinary member on each state and municipal board of health. He stressed the dire need of veterinary students for training in ethics and business principles during their college course. Doctor Butler appraised the progress of veterinary education as being the most important that had been made during the preceding century, but deplored the lack of practical training on the part of many recent graduates.

He is survived by his widow, a son and a daughter.

* * * *

Work for a Censor

There is no opponent of the control of rabies, however rabid himself, but can and does quote veterinary research to prove his point; that his quotation is usually beside the point is of no consequence to him.

Against anti-rabies vaccination opponents of all control of rabies marshal particularly convincing arguments based upon official research; yet the veterinary profession has repeatedly gone on record in its national association as favoring anti-rabies vaccination; vaccination has never failed to suppress an outbreak of rabies where it has been used; it has not failed to hold rabies incidence low where used continuously in as much as 60% of the dogs, and it remains the most easily applied and, therefore, the most effective means for the control of rabies in this country.

The fact is, some careful research was reported in a way to bring considerable discredit on a meritorious product. Of what practical significance is it, or was it, that rabies vaccine will not protect dogs against intraocular or subdural injections of massive doses of fixed virus? Fixed virus is no hazard for naturally inoculated dogs and to report this, or report that street virus, when injected intramuscularly or subdurally in massive doses, will cause rabies in vaccinated dogs without reporting also that it will protect naturally infected dogs in a high percentage of cases. is to place in the hands of those opposed to the control of rabies their most effective argument against vaccination. They do not explain, of course, that the vaccination failed against a purely laboratory disease inoculated in an artificial manner.

Rabies vaccine possesses weaknesses, the chief one being a lack of permanency in the protection it gives, and another a failure to provide 100% protection. In this latter matter, however, its score is about that of the average biologic product and better than that of some that receive unquestioned acceptance. Why discriminate against it alone?

The opponents of rabies control have often charged that veterinarians' interest in the matter is a pecuniary one, but until now they have had to rely upon pure assumption for the statement. At the recent meeting of the United States Live Stock Sanitary Association, however, a committee report supplies backing they will not be slow to use. In part it states:

> As a rule veterinarians who are in small animal practice hesitate and are not willing to coöperate or assist in the eradication of rabies. We shouldn't expect assistance from them because it would possibly cost them business.

The statement is preposterous and based upon a lack of information. In the first place, veterinarians engaged in small animal practice are just as public spirited as any other class of citizens in any profession, trade or other occupation and it is a slander to say that they are not willing to coöperate or assist in the eradication of rabies. In the second place, the economic cost of rabies to such practitioners is greater than its cost to any other class, except dog breeders. The veterinarian's humanitarian instinct as well as his financial interest incline him to use every effort to accomplish the suppression of this disease. It is true that small animal practitioners have disapproved the measures sometimes used for the control of an outbreak of rabies, and the results of some of the methods have amply justified such disapproval; but we have yet to hear of one who did not coöperate with the authorities even in carrying out measures that he, personally, disapproved.

The Uses of Male Hormone

The administration of male sex hormone has been put on a scientific footing. Thanks to the chemist, a synthetic preparation of testosterone, the active principle of the testis, is available in such a form that it retains activity for some days after intramuscular injection or can be given effectively in tinctures or unguents applied to the skin. With so powerful an agent in our hands it is important that the indications for its use should be critically considered. As a substitute for the natural secretion of the testis testosterone has been proved wholly effective; it can restore to the male castrate the power of erection and the ability satisfactorily to perform coitus, and in eunuchoidism it can complete the arrested development of the male secondary sexual characters.

Apart from their substitutive action androgens are now employed to antagonize estrogens and to inhibit pituitary activity. This has led to their use on female patients. Given in large doses they arrest the menstrual cycle and cause amenorrhea of variable duration, and their administration has accordingly been advocated in cases of metropathia due to unopposed estrogenic activity. The effect of testosterone on chronic "mastitis" is also being investigated. The changes in the breast tissue in some of these cases suggest excessive estrogenic activity and large doses of male hormone may reverse such changes. It appears, however, that in both these conditions really big doses are needed to give the desired benefit.

The essential fact, however, is that androgenic therapy has now been made capable of achieving objective results. The new and potent preparations of the hormone need to be used shrewdly and with caution, but they offer great opportunities. —*The Lancet*, London.

* * * *

When instituting preventive measures against infectious abortion, it is necessary not only to pay attention to secure breeding animals with robust constitution, but also to the problem of feeding, lactation, and the circulatory system.—*R. Wille.*

The most practical person is one who builds successfully for the longest future, illuminating the task of the hour by a vision of its distant relations.—*Chas. A. Beard.*

* * * *

Sulfanilamide and prontosil possess no practical chemotherapeutic value in malaria, and they cannot be regarded as satisfactory or safe substitutes for quinine.—*P. H. R.*, 53:31, p. 1366.

* * * *

Veterinary Student Wins Rhodes Scholarship

Birdsall Carle, senior student in the College of Veterinary Medicine at the State College of Washington, was one of four successful candidates for a Rhodes Scholarship in the six northwestern states of Washington, Idaho, Oregon, Montana, Wyoming, and North Dakota.

Birdsall Carle came to the State College of Washington in September, 1934, and has had all of his college training while majoring in the College of Veterinary Medicine. He has been on the all-college honor roll six times and has received the Alpha Psi award given annually to the best sophomore student in veterinary medicine.

The Rhodes Scholarships are worth approximately $2,000 a year for two years' study at Oxford University, England, with an optional third year for additional work. A candidate is examined by a committee from his home state. Successful state candidates are then examined by one of eight district committees representing six states each. Examinations cover not only the past studies of the applicant, but his plans for life, his aspirations, and his extra-curricular activities.

Small Town Meat Inspection

By E. T. BAKER, Moscow, Idaho

ABOUT eight years ago our city council passed a very good meat inspection ordinance. Due to the well advertised depression that came along about that time, it was compelled to lie in state for lack of available funds to enforce it.

The writer was asked by the council to consider the job on a fee basis, so it would be self-supporting, but we gracefully declined. We could vision a financially-anemic rancher driving into town with a dressed pig reclining on the rear seat of an ancient but still dignified Model T. Then, after we had inspected the graceful form of what had once been Mrs. Chester White's favorite son, we would have to request a two-bit fee.

In those days of three-cent hogs, a good sized carcass would bring in trade only four pounds of tobacco, a quart of moonshine, one pound of coffee, fifteen cents worth of sugar, and an all-day sucker for each of the younger generation.

The Ordinance Revived

Several years ago, women's clubs in Idaho began to complain about the kind of meat available for home consumption. It was charged a large part of our beef came from deceased Bang's disease reactors, while our healthy cattle were shipped elsewhere. There was little, if any, complaint about tuberculous beef, for that disease is practically non-existent in our cattle. It is fairly common in swine and poultry.

Last year, at the request of the city health officer, the mayor and council appointed us city meat inspector on a part time basis, at a salary of $50 per month, to be paid out of the city general fund.

For this, we agreed to inspect all meat brought into town, not federally inspected, and to perform post-mortem examinations at a small slaughterhouse near town.

We have six meat markets, one cold-storage, locker plant, and the slaughterhouse mentioned above. At the latter plant, butchers or farmers may have their animals custom killed for the following prices: Cattle, $2, plus hide; veal, $1.25; mutton, 75 cents, plus pelt; hogs, one cent a pound, live weight. This plant is not run by the city. Butchering is done about three times a week.

Supplies Needed

Our first problem was to figure out what supplies would be needed, and how to conduct the work to the best advantage of the butchers, farmers, slaughterhouse operator and ourself.

We intended having a round copper stamp made, but an attorney told us the government had the prior right to this shape, so we designed the following diamond-shaped stamps:

As copper engraved stamps cost about $14 each, we had four rubber stamps made at a cost of $2 each. One "passed" with a short handle, convenient to stamp the inside of a veal carcass; one "passed" with a 15-inch handle for stamping the hind quar-

ters of beef on the rail. The "rejects" were made in the same fashion.

We secured a gallon of edible ink for $3, and find we use about four ounces per month. An ink pad, small hook for pulling around meat to examine it, a note book for our records, for we make a monthly report, and long white frock completed our outfit. The total amounted to around $15.00.

To become acquainted with the work, and brush up on the "lymphatics," we took a trip to Spokane. We might add that after working three years with Doctor Sisson on his anatomy as a student, and typewriting the entire work of 781 pages, with a 43-page index, while spending a few years at Ohio State, we were surprised to find out it would take a 900-page book to contain what we did not know about the subject. Our sincere sympathy to luckless freshmen taking their first examination.

At Spokane, Doctor Zimmerman, federal Inspector-in-Charge, rendered us every assistance in his power, and Doctors Flory, Overhulse and Murray gave us some much-needed pointers on the work.

The Actual Inspection

We make our rounds of the six markets and the cold storage plant between 10 and 12 Monday, Wednesday and Friday mornings. By this time, the shops have sent out their morning orders, and we have had time to make our early country calls.

The markets have three sources from which to secure their meats and poultry: first, from the large packing plants where federal inspection is maintained, and which requires no attention on our part; second, from the local slaughterhouse, and third, from farmers who have "butcher permits." In Idaho, a farmer may secure this permit from the county auditor for an annual fee of four-bits, which is a check on the hides. In our county, about 40 farmers have these permits. Of course, none is needed when a farmer butchers his own stock for his own use.

A farmer may bring a dressed carcass into town with the liver attached, and we inspect this either before he sells it to the butcher, or afterwards. We affix our stamp, which shows he has complied with the ordinance.

We go through the markets three times a week, as above stated, and if we notice any product not fit to put on our own table it is destroyed. We find it takes about three half days a week to inspect the meat and poultry (our city council lacking the penetration of the U. S. Congress was unable to discern a reason for exempting diseased poultry from condemnation) used in our town of 9,000, which includes 2,500 university students and fraternity house bull dogs. About 300 carcasses, weighing around 75,000 pounds, are examined each month, 250 to 800 pounds being condemned.

Most of our "rejected" are due to improper butchering, submaxillary abscesses, spotty livers, bruises and fractures, icterus and emaciation. Even a simple minded country calf, jerked away from its doting mama before it has had a chance to get the colostrom, may be thin at six weeks of age. Kept in a dark, filthy pen, and fed nothing but skim milk and the hopes of a better hereafter, its meat does not make very nutritious breaded veal steak with tomato sauce. In poultry, tuberculosis and abscesses are found more frequently than other causes for condemnation.

One rejected carcass we recall is a sample of what may occur on any farm, and its story is a sad and tragic one. This particular rancher had a calico-colored heifer, one part blue shorthorn and two-thirds dynamite. She was a triple-threater, being able to kick, hook and run at the same time. We remembered her quite well, having spent nearly an hour drawing a tube of blood from her for the Bang's disease test. Our assistant had to rope her on the dead run, and it took three of us to snub her up so we could bleed her between "yumps." And yet some kid-gloved officials think a practitioner does not need help to test these wild and woolly critters!

One day, the kind-hearted owner noticed this heifer had a bad sore on her hind leg, and getting her in the barn, decided to play the good Samaritan and apply some medicine. He sat down beside her and touched the lesion with some healing balsam. Just

what happened next is not exactly clear, for he only remembers getting kicked between the short ribs and the granary door.

After he came to, he made a careful inventory to see that he was still intact, and then he began to grow irritated. He rushed into the house, grabbed his trusty deer rifle, and came back to the barn with a body temperature of around 105° F. in the shade. He evidently shot too low, for the heifer broke her halter rope, and "busted" through the door and up in an old orchard, with the owner trying to keep up. He finally cornered her, and shot again, this time killing her as dead as she will ever be, and then he had to run back to the house to get his butcher knife to stick her. As this was an average farmer knife, it took quite a while even to puncture her hide. He finally got her dressed, with most of the blood still in her various tissues and organs.

We had to turn the carcass down, but helped him dispose of it to some coyote hunters for hound vitamins.

During the recent Thanksgiving season, over 6,000 pounds of turkey, and 4,000 pounds of chickens, geese and ducks passed through our markets. In addition, our mighty hunters, who average nearly 20 miles to the quart, brought into the cold storage lockers 51 deer, 36 elk, two bear, and a large number of Chinese pheasants and wild duck. A few domesticated rabbits were also consumed.

Advantages of Meat Inspection

An inspector who does not regard himself too seriously can do a lot of missionary work among producers, handlers and consumers. We regard our work as divided among all three types of people.

We find that farmers are eager to receive tips on how to fatten and prepare animals for markets, and being among our clients, we can advise them more freely than could a stranger.

We find the duties pleasant and interesting, and, unlike Bang's disease testing, which is about the hardest work we have ever performed, meat inspection is more like office practice.

All towns and small cities should have meat inspection. Veterinarians who are interested in our ordinance may have a copy by sending us a self-addressed, stamped envelope.

Doctor Baker is one of our greatest exponents of the use of common sense in veterinary practice. He is also just about the most respected citizen in his community, unquestionably the best bowler in his town, and has won a prize for being the best amateur photographer in his state. He has contributed articles to this magazine regularly for a score of years, and all have been embellished by means of his trusty graflex.

Veterinary Colleges*

OUR American veterinary colleges have made long strides forward during the past year, in equipment, faculties, curricula, student enrollment, and public and professional interest.

With the help of God, energetic deans, and the WPA, the real property of our colleges has been greatly increased. New York, Texas and Iowa are now using their new buildings. Michigan is erecting a $133,000 clinic building. The University of Pennsylvania has acquired a school of animal pathology through the bequest of a 400 acre estate. This estate consists of three farms, each with buildings, stock, and equipment. A laboratory has been promised for the project by the University. Pennsylvania also has recently acquired a therapeutic x-ray machine, said to be the largest and best of its kind in the world. A laboratory for the study of the diseases of wild animals has been instituted in Washington jointly by the United States Biological Survey and Washington State College. Iowa State's veterinary quadrangle has been embellished by a large mural depicting the various activities of our profession. A statue entitled "The Veterinarian" is presently to be placed in the courtyard. The United States Bureau of Animal Industry has established a Regional Disease Research Laboratory at Auburn, Alabama, of which Dr. B. T. Simms, former head of the veterinary division of Oregon State College, is director.

There were the usual minor changes in faculty personnel in all the colleges in 1938, and increases were made in several of the faculties.

Alabama added a pathologist, an anatomist, a bacteriologist, and a professor of medicine. Colorado increased its research staff. Michigan added an instructor in clinic, one in bacteriology, and two in anatomy. Pennsylvania added an instructor in animal industry. Washington added a poultry specialist for research and teaching. Ontario added a bacteriologist.

Further balancing of the curricula of the various colleges took place by the addition of courses in some of them. Alabama added embryology and biochemistry, and advanced courses in histology, physiology, bacteriology and pathology. Kansas added a senior seminar, two courses in clinical pathology, and advanced parasitology. Ontario added a course on the diseases of fur-bearing animals.

All ten of the United States schools require one year of college work before entrance into the professional school. Ontario requires candidates to have a high school education, while entrance to the Montreal veterinary college is by examination. The Mexican college, which incidentally requires six years work, requires that applicants for admission have a B.S. degree. Kansas and Colorado require their students to have a "C" average in their preliminary work. This is practically equalled in the other schools through selection of candidates.

The preparatory year is designated variously by different colleges, but broadly speaking, English, chemistry, and biological sciences, supplemented by animal husbandry, social science, languages and physics, are the subjects required.

Alabama is wooing public approval by considering requiring two years of preparatory work, including all the foregoing and medical vocabulary and mathematics.

Only two schools, Ohio and Pennsylvania, offer regular courses on the subject of ethics. Three colleges, Iowa, Kansas, and Pennsylvania, offer instruction in business principles and methods. Colorado, Cornell, Kansas, Michigan, Washington, and Ontario have courses in jurisprudence which may include some instruction in ethics and business. It is hoped at least that in all the colleges these subjects will be taught incidentally in courses in clinic and medicine.

Considerable interest has developed the

*Excerpted from the report of the Committee on Colleges of the Minnesota Veterinary Medical Association to the annual meeting of the Association, St. Paul, Jan. 9 and 10, 1939. R. Leland West, O. B. Gochnauer and M. S. Thorpe constitute the committee.

past year in the matter of the ability of veterinarians to handle food hygiene work, due to the attitude taken by the United States Public Health Service recently in employing sanitary engineers as milk inspectors. The Federal officers argue that only an engineer can properly check and control the machines and mechanical processes employed in creameries and dairies. On the other hand they can see no reason why these engineers cannot be given a few lectures in pathology and bacteriology and forthwith become competent to inspect the milk and the cow, as well as a veterinarian. Such an attitude is of course absurd. No clear thinking person can help but realize, that only the veterinarian has the background in pathology to inspect cattle competently.

In the address of the president, at the New York meeting of the American Veterinary Medical Association, Dean Brumley stated that he would favor two or three new veterinary colleges if properly located and staffed. Illinois veterinarians feel that a college located in their state would better serve Illinois students, increase the ranks of Illinois practitioners, and lend prestige to the profession. They feel that they must have greater numbers before they can successfully handle any state-wide projects along public health or other lines. Dr. N. S. Mayo, chairman of the Committee on Education of the American Veterinary Medical Association and a native of Illinois, states that Illinois and California are the logical sites for new veterinary colleges.

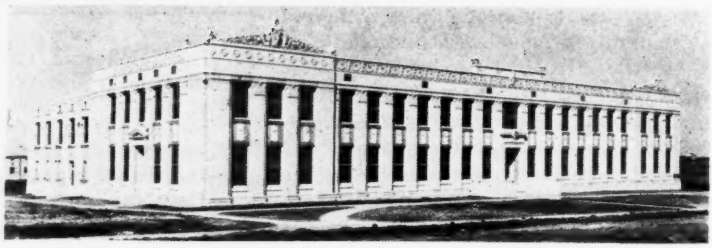
Much has been said during the past year on the subject of interneship before graduation from a veterinary college. In a canvass of the deans of our colleges, they were found agreed that interneship is desirable. Alabama and Ontario now have this requirement in force. Cornell is considering its introduction. Iowa, Michigan, and Ohio strongly advise their students to take summer work with practicing veterinarians, and assist in placing them.

Pennsylvania, Colorado, and Washington agree to the value of interneship but question the practicality of making it a requirement. The chief objection seems to be that there is difficulty in finding qualified men with whom to place the students. This committee cannot believe that in the United States there are not 500 practitioners with character and experience to qualify them as preceptors.

The Minnesota Veterinary Medical Society has a full complement of active committees, including committees on infectious diseases, medicine, surgery, milk inspection, public relations, colleges, etc. Their reports constitute much of the program of annual meetings.

Kansas feels that the interneship requirement comes within the province of the various state boards. We cannot agree. The small Mexican college is far ahead of the United States colleges in that it requires that all professors must have at least five years of practice before appointment. This committee feels that whether a man is in the field of teaching, research, public health, state or federal work, the army, or commercial work, some practical experience is essential. Practice is the foundation of

Entrance to the Veterinary Court, School of Veterinary Medicine, University of Pennsylvania



Veterinary Building, Texas A. and M. College, College Station, Texas

the veterinary profession. All other branches are auxiliaries in one way or another to the practitioner. The auxiliary branches of the veterinary profession cannot serve usefully unless they have some idea of that with which the practitioner has to deal. For far too long students have been listening to professors who have no conception of what the veterinarian needs to know in the field. Too long we have read reports from laboratories on diligent studies of the reactions of the horse to cream in his coffee. Too many milk inspectors think that the bacterial count in a quart of milk is something to be included in a report, rather than something due to the condition of the cow or the conditions under which the milk has been handled. Too long have we dealt with commercial houses that recommend drugs not indicated or impossible to administer.

It is obvious that any veterinarian should have a little actual practice before hanging out his own shingle. What new graduate has a working knowledge of business principles or ethics? Who among them has confidence that he can actually do the things he will have to do in line of duty? The college gave him the science of veterinary medicine. Only practice can teach him the art. For his own good, for the good of his prospective clientele, and for the good of the profession as a whole, the degree Doctor of Veterinary Medicine should represent the ability to diagnose a case and treat a diseased animal.

In conclusion, the Committee on Colleges has these suggestions to make:

1. That the colleges make an effort to inculcate into their students a clearer idea of ethics and business principles.

2. That veterinary college graduates be encouraged to undertake graduate study, especially if they contemplate engaging in public health work.

3. That the number of colleges be not increased unless some new field of service be opened to accommodate an excess of veterinarians.

4. That the veterinary colleges of the United States be strongly urged to include a period of interneship as a prerequisite to graduation.

Veterinary Clinic and Department of Pathology, Ohio State University

Community Sales

A glaring objection to auction markets is the spread of diseases among live stock. Without a question, it is impossible to bring live stock together from various farms and to shift ownership without spreading diseases from one farm to another.

A great number of live stock sold through public auction may have come from a distance of from 100 to 500 miles and it is difficult to know the condition of the animals and the condition of the herds from which they came.

Live stock free of disease, may leave the farm for an auction market, but they are exposed in the truck and in the pens at the yards. A few days after such animals reach the farm they may come down with disease, usually resulting in a severe loss to the owner, and from this center of infection the disease may spread to the live stock on the farms in the immediate vicinity.

The live stock industry of our states can not be protected against disease if there exists a huge number of cesspools of infection from which it is possible to spread the various diseases to which our live stock is heir.

One state live stock sanitary official reporting on auction sales, states: "Hog cholera has increased 84% since the beginning of auction sale barns. Up to that time, we had no swine erysipelas, but lately we have been able to trace several cases of this to hogs that had been imported from an infected district and sold at an auction sale."

Another state live stock regulatory official states: "We do not have any laws or regulations governing auction sales and a veterinary inspection is maintained at only one sale.

"The auction sales are, in my opinion, one of the greatest sources of disease affecting live stock. We have had many outbreaks of hog cholera in animals purchased at these sales, and in many cases farmers have not only lost all the animals purchased, but have brought infection on to their farms which spread to other hogs and they also died. The same may be said concerning other swine diseases."

Still another regulatory official says: "We have in this state 172 community or auction sales, and I think without a doubt these sales are responsible for more outbreaks of disease, especially diseases of swine, than any other one thing. We have no law in this state under which we can regulate such sales."

The result of numerous investigations in our own state (Ohio) during the period 1930-1936 showed conclusively that diseases of swine, such as cholera, necrotic enteritis, influenza, erysipelas and mange originated from hog sales, which were used as a dumping ground by unscrupulous farmers and live stock dealers. In many instances some of these diseases became epizoötic and of widespread importance.

The situation was recognized as a serious menace to our live stock industry which has a valuation of over 200 million dollars. This, and a widespread criticism and condemnation of auction sales, prompted the Ohio legislature in 1935 to enact a law entitled: "To prevent the spread of infectious and contagious diseases of live stock; to require dealers and brokers to be bonded and licensed; to provide for the revocation of such licenses; to provide for the inspection and disinfection of yards, pens, premises and vehicles; to confer powers on the Department to promulgate and enforce laws and regulations, and to provide penalties for violations or refusing to comply with any of the provisions of this act." The law was amended and strengthened in 1937.—*F. A. Zimmer, U. S. L. S. S. A. Dec. 1938.*

* * * *

Knowledge of the fundamentals for efficiency of performance is of special importance. The veterinarian possesses this knowledge and he, therefore, regards production, not like the majority of breeders who regard it only from the point of view of economy, but also from the aspect of physiological requirements of the body and the functioning of the vital powers of the animal.—*Valentin Stang,* in *Vet. Rec.*, 50:43.

Kansas Horse Plague and Encephalomyelitis

By J. R. ZECHA, Ellinwood, Kansas

IN 1937 I treated 587 cases of infectious equine encephalomyelitis; in 1938 I treated 412 cases. Having treated approximately 2000 cases during the Kansas horse plague in 1912 I am frequently asked if it was the same disease, we now know as encephalomyelitis due to a filterable virus. That question is probably unanswerable. The clinical manifestations of the earlier epizoötic differed from those of the more recent, and no filterable virus was found in the 1912 outbreak, despite a great deal of search for the cause of the disease by able pathologists and bacteriologists. On the other hand, there were many similarities between the cases then and now. If we were dealing with any affection other than of the central nervous system, the differences would compel the conclusion, that the 1912 plague was not the disease prevalent in this section last year and the year before. But diseases of the central nervous system in any animal are often characterized by such varied and bizarre symptoms that it is hazardous to say that since two given attacks do not look alike or act alike, they are not the same disease.

■ It would serve no useful purpose to attempt to catalog all the symptoms observed in either outbreak. Any who saw cases running into the hundreds in 1912, saw symptoms of about every ill to which horse flesh is heir. Many of the more unusual of these symptoms were due to complications, many were attributed to the plague because of faulty diagnosis and a still greater number were due to the senseless treatments of empirics of which more will be said later. In the recent outbreaks, in marked contrast with the earlier, the symptoms were nearly all uniformly characteristic and there was less cause for faulty diagnosis and fewer such diagnoses. The symptoms that occur over and over in the majority of cases are probably those by which the pathology should be judged; the uncommon symptoms being charged to faulty diagnosis, complications, or individual peculiarities.

The characteristic symptoms of the Kansas horse plague during the 1912 outbreak differed markedly from those of recent years, as will be seen by the following:

In the first place, the older disease was known to the laity as "blind staggers", "forage poisoning", or "cerebrospinal meningitis", the majority calling it "blind staggers". It would never have occurred to the laity to have called the disease "sleeping sickness". They might have called it fits or convulsions or walking disease or rabies or crazy staggers, but nothing suggestive of somnolence in the earlier stages or until dissolution approached.

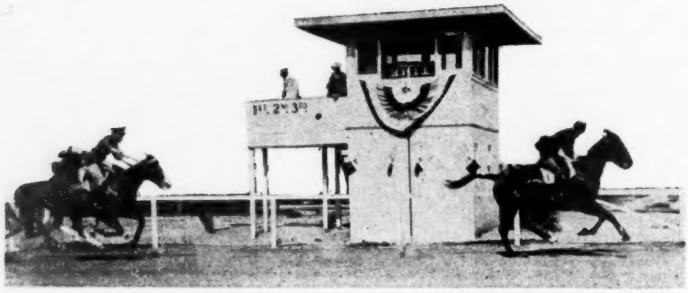
Characteristic symptoms were: Excitement, even mania, attempting to walk through or over any object, pressing the head against a wall or tree, rearing and striking when an attempt was made to lead or move them. Convulsions were easily brought on, a loud noise, a quick blow, being sufficient to cause the animal to start, fall, and struggle. Pulse and respiration were accelerated during stages of excitement; during calm periods the pulse was rapid and weak. Paralysis of the pharynx developed comparatively early, often of the tongue and lips and even more frequently of groups of muscles about the neck and face, giving the animals a grotesque appearance. In the early stages of the disease, digestive disturbances were also prominent. There was a foul breath, complete loss of appetite, obstinate constipation, and cold sweat, either slight or profuse. Till near the end of the 1912 outbreak, the disease was more acute than the outbreaks of recent years, often running its course in less than 12 hours, and the average mortality was more than twice as high. Fewer animals seemed resistant to the old disease. Often when it appeared on a farm, all the horses (in those days 12, 18, 25 or more) would contract it, and not uncommonly all died.

■ The symptoms, varying in individual cases, course and other characteristics of the epizoötics of 1937-38 are too well known to require repetition. While all of the symptoms given in the foregoing paragraph could be observed in the recent outbreak if one saw enough cases, they were not characteristic of them. After the Kansas plague was over, for a year or two the number of animals that died was estimated at 20,000. Of recent years, many have been putting the loss at 30,000. It seems well to put on record that no one has the faintest idea of the number of animals that succumbed during, I will not say "of" the plague, since more died of quackery than of the disease itself. However, the horse population in those days was large and the territory involved was large as well. One man's guess is about as good as another's; but it is mine that the loss was far greater than in either the 1937 or the 1938 outbreak.

■ To a far greater extent than in the recent outbreak deaths due to causes other than the plague were attributed to it in 1912. Cases of heat stroke or sunstroke, auto-intoxication, fatal colics, parasitic anemia, sclerostomiasis with cerebral apoplexy or thrombosis, were regularly called cerebro-meningitis by excited horse owners and by the horde of quacks attracted by the hundreds to the rich harvest all this made for them. These and other ailments but, especially sclerostomiasis, figured prominently in the losses in my territory of Barton, Wise, and Russel counties, Kansas. The ministrations of quacks sent thousands of horses and mules to the bone-yard. In my territory some druggists prescribed all the old, nonsaleable drugs on their shelves for prevention of the disease, or its cure. If the concoctions were too offensive for the animal to take, the directions were to administer it through the nose. When the animal died, the explanation was that the medication had been administered too late. The title of "horse doctor" was acquired overnight by anyone handy at drenching a horse, and more cases than they could possibly attend awaited them the next morning. With a confidence born of ignorance they administered anything from toxic doses of arecoline hydrobromide to a dilute solution of potassium permanganate for a vaccine. They turned the animals to tanks of water freshly disinfected with a pint of phenol. Turpentine was a favorite remedy, being given orally, through the nose, hypodermically, topically, and even poured into the ears. Entire herds were thus wiped out and the owners were convinced that they had waited too long before resorting to preventive measures, and that the horses had died of the plague. I saw one garrulous old fellow, who had assumed the pseudonym of "horse doctor", inject chloroform and turpentine into an animal's ears to drive the "worms" causing the plague from the brain. The owner was easily convinced that the resulting otitis was due to the plague coming out of the brain by the aural route. Another smoked the worms from the brain by forcing the inhalation of smoke from burning rags, feathers, rubber, and the like; if the animal then died from pneumonia, the cause of death was still said to be plague. Another, delving into the realms of pure theory, decided that the horses' "brains became tight"; his method of treatment was therefore to apply a block of wood firmly to the forehead, and strike it sharply with a hammer. If the first blow failed to make the animal's eyes water and nose run, a second was administered. If the horse died of concussion of the brain, it was a sign that his brain was already too tight for cure—and again the death was written off to the plague. Many animals had received some such treatment before a qualified veterinarian was called; no wonder that the symptoms he encountered were confusing!

■ This was not the case in the 1937-1938 epizoötic, since protective veterinary laws have been passed and enforced; and losses as a result of meddlesome medication that came to my attention were insignificant. In a few instances valuable animals which might have been saved died from lack of attention or were destroyed because the owners had been informed over the radio "there is no cure for encephalomyelitis."

Racing in the United States—



Prophecy — 1843

In the United States, owing not only to the great territorial extent of the country, but to the natural obstacles which divide its remote sections, and the extreme differences of climate, there never has been, and probably never will be, established central race courses, where horses from all parts of the States may habitually meet, and test their relative superiority by actual contest.—J. S. Skinner, editor of the *American Turf Register and Sporting Magazine.*

Problem — 1939

That racing is faced with serious problems is evident to every student. The season in North America now extends from January 1 to December 31, annually, without a let-up. Where in 1915 there were 839 days of racing at all the tracks on the continent with a total distribution of stakes and purses of $2,800,000, there were last year 2,140 days of racing with more than $14,000,000 in stakes and purses.—*Horse and Horseman.*

Best American Races 100 Years Ago

BEST RACES AT THREE-MILE HEATS.

Name.	Sire.	Age. Yrs.	W'ght. lbs.	Time.	Beating the undermentioned Horses.	Course.	Date.
Blue Dick.....	Imp. Margrave	5	114	5.44—5.38½	Heiress, and Young Dove.....	Trenton, N. J....	May, 1842.
Passenger	Langar.....	3	90	3d heat 5.44	Argyle, and others.....	Do.	
Sally Walker....	Timoleon	5	107	5.44—5.42	Ariel.....	Broad Rock, Va...	Sept. 1827.
Andrewetta.....	Andrew.....	5	111	5.48—5.42½	Bandit, and Raritan.....	Trenton, N. J....	May, 1840.
Omega.....	Timoleon	5	111	5.48—5.43—5.47 ..	Clarion, and Truxtun.....	Do.	Oct. 1839.
Sarah Bladen ...	Imp. Leviathan	6	107	5.49—5.41½	Lucy Fuller	New Orleans.....	March, 1840.
Master Henry...	Henry	6	118	5.47½—5.40—5.56 6.01	Wonder (who won 1st heat), Argyle (who won 2d heat), and others.....	Kendall's, Md....	May, 1839.
Sussex	Sir Charles ...	4	100	5.46—5.43	Polly Hopkins, Sally Hornet, May Day, and others.....	Broad Rock, Va...	Spring, 1830.
Arbaces.....	Bertrand	4	86	5.45—5.43	Naked Truth, and Alice Riggs.....	St. Francisville, La.	April, 1837.
Clara Howard...	Imp. Barefoot .	4	101	5.47—5.45	Henry Archy, and Charles Kemble.....	Union Course, L. I.	June, 1835.
George Martin ..	Zinganee	5	100	5.40—5.46	Tom Marshall, Liz Hewitt, and Humming Bird	New Orleans.....	March, 1842.
Treasurer	Imp. Roman ..	4	104	5.42	Andrewetta.....	Union Course, L. I.	June, 1840.
Black Maria....	Eclipse	7	123	5.42	De Witt Clinton	Po'keepsie, N. Y.	Oct. 1833.
Red Bill.....	Medoc	4	100	5.40—5.48—5.49 ..	Blacknose (who won 1st heat), Occident, and others.....	Lexington, Ky....	May, 1840.
Astor	Ivanhoe.....	5	110	5.45—5.44	Telemachus, Hector Bell, Rienzi, and others.	Washington, D. C.	June, 1841.
Pressure	Trumpeter ...	4	86	5.49—5.44	Dick Chinn, Pollard, Pete Whetstone, and Susan Yaudell	New Orleans.....	April, 1838.
Balie Peyton....	Andrew	4	100	5.45—5.44	Stockton, Mary Selden, Red Fox, and Rowena	Kendall's, Md.....	May, 1838.
Blacknose	Medoc	4	100	5.45—5.46	Laura Webster.....	Lexington, Ky....	Sept. 1840.
Ripple	Medoc	4	100	5.51—5.47—5.44—5.52	Lucy Fuller, Maria Collier, Laura Webster, and Collier	Louisville, Ky. ...	Oct. 1840.
Bertrand	Sir Archy	5	112	5.47-5.48-5.53-5.54	Aratus, and Creeping Kate.....	Charleston, S. C...	Feb. 1826.
Sarah Washington	Zinganee	5	107	5.40—5.45	Milton Brown, and others.....	Kendall's, Md.....	May, 1842.
Flirtilla	Sir Archy	5	113	5.59—5.42½	Ariel, in a match	Union Course, L. I.	Oct. 1833.
Black Maria....	Eclipse	7	123	6.02—6.07—5.48..	Virginia Taylor, Rolla, Alice Grey, & Jackson	Do.	May, 1833.
Blue Dick.....	Imp. Margrave	5	114	5.42—5.39½	Sarah	Alexandria.....	June, 1842.

A Century of the Sport of Kings

WHAT one might call genuine horse racing, on an official scale, began in this country when in 1664 Col. Richard Nicolls, first English governor of New York, laid out a race-course as one of his first actions after taking office. He called it Newmarket after the most famous track back home. It was a two-mile oval on Long Island, where Garden City is now located. There he sponsored racing twice a year, and for the big event offered a silver cup, the first turf trophy run for in the New World.

It was not until long afterward, however, that a breed of race-horses was established in the future United States. When it was, that process took place to the South, in the three colonies of Maryland, Virginia and Carolina.

The first real or so-called Thoroughbred that ever crossed the sea from the Old Country is supposed to have been "Bulle Rock," who landed in Virginia in the year 1730, or 65 years after Gov. Nicolls made his historic gesture. The first one known to have been brought into Maryland was "Spark," imported by Gov. Ogle in the year 1747. Pennsylvania's first importation was that of "Tifter-the-Third," in the year 1752. And not until 1754 does New York come forward with "Telemachus."

That *bred* race-horses, as they were then called, had been taken north from Maryland and Virginia into Pennsylvania and New York before the latter states began direct importation from England, we may take as certain. Even this early the South had become established as a country of plantations, agricultural and pastoral, while the North was urban, commercial and cosmopolitan. Bred horses, stud farms, and race-courses had become familiar parts of the social scheme in the South generations before they did in the North.

But by the year 1765 New York had taken a prominent place in the turf world and, in especial, boasted a devotee of both the

BEST RACES AT FOUR-MILE HEATS.

Name.	Sire.	Age. Yrs.	W'ght. lbs.	Time.	Beating the undermentioned Horses.	Course.	Date.
Fashion.....	Imp. Trustee....	5	111	7.32½—7.45	Boston, in a match, [he 9 yrs. old, with 126 lbs.]	Union Course, L. I.	May, 1842.
Eclipse	Duroc	9	126	7.37—7.49—8.24	Henry, in a match.....	Do.	May, 1823.
Boston	Timoleon	5	114	7.40	Charles Carter, who broke down end of 3d mile.	Do.	June, 1838.
Wagner.....	Sir Charles	5	110	7.48—7.44	Grey Eagle, Queen Mary, and Hawk-Eye...	Louisville, Ky.	Sept. 1839.
Wagner.....	Sir Charles	5	110	7.51—7.43	Grey Eagle, (five days after preceding race)..	Do. ...	Oct. 1839.
Grey Medoc	Medoc	6	110	7.35—8.19—7.42 8.17	Altorf (by Imp. Fylde), and Imp. Denizen ...	New Orleans.....	March, 1841.
Lady Clifden....	Sussex	4	101	7.44 — 7.43½ — 7.56¼	Fanny Wyatt, Picton (by Imp. Luzboro'), and Mingo	Union Course, L. I.	Oct. 1837.
Jim Bell	Frank	4	86	7.37—7.40	Sarah Bladen, and Martha Carter.....	New Orleans.....	March, 1842.
Miss Foote	Imp. Consol	4	83	8.02—7.35	Earl of Margave, Hannah Harris, and Luda..	Do.	March, 1842.
Sarah Bladen ...	Imp. Leviathan..	7	115	7.45—7.40	Luda, Imp. Esper Sykes, and Westwind (by Imp. Chateau Margaux)	Do.	March, 1841.
Omega.....	Timoleon	4	97	7.40—8.01	Mediator, Medora, Prince George, and Wonder	Washington, D. C.	Oct. 1838.
Duane	Imp. Hedgeford .	4	100	7.42½—7.58½ ...	Balie Peyton (who won 1st heat), and Stockton	Baltimore, Md. ...	May, 1838.
Fanny Wyatt ...	Sir Charles	3	87	7.48—7.53	Mingo	Trenton, N. J.....	Nov. 1836.
John Bascombe..	Bertrand	5	114	7.49—7.51	Post Boy, in a match, (course heavy).....	Union Course, L. I.	June, 1836.
Eutaw	Imported Chateau Margaux	5	110	8.01—7.43	Sarah Washington, Bengal, Pryor, and others.	Washington	May, 1842.
Miss Foote	Imp. Consol	4	97	7.42—7.40	Argentile, Alice, Corneal, Kate Holton, and Lavota	Lexington, Ky....	Sept. 1842.
Miss Foote	.....	4	97	7.36½-7.39-7.51¼	George Martin.....	New Orleans.....	Dec. 1842.

The racing tables given on this and the preceding page, from Youatt's "The Horse" (1843), are interesting chiefly for the long distances and inferentially the hardihood of the animals. The record of trotters of that day is even more astounding in that heats were often five miles, and as many as four were run in an afternoon. Further, private races were commonly 10 miles in length and often up to 20 miles, while occasional races of 30, 50, and even 100 miles were run. Thus "Topgallant" trotted 12 miles in 38 minutes; Yankee Sal 15 miles on a heavy course in 48 minutes; Jerry, 17 miles in 58 minutes; Paul Pry, 18 miles in 59 minutes; Chancellor, 32 miles in less than two hours, and Tom Thumb, 100 miles in 10 hours and 7 minutes. One hundred years of selective breeding have increased the speed of our race horses materially, but 100 years of feeding on timothy hay and oats have reduced the stamina to an even greater degree.

turf and stud who was perhaps more conspicuous than any of those in Maryland or Virginia. This was Capt. James DeLancey.

The DeLanceys were the wealthiest and one of the most aristocratic families of colonial New York. The founder was Stephane DeLancey, a native of Normandy, one of the Huguenots who fled from France when the Grand Monarque, Louis XIV, issued his famous Revocation of the Edict of Nantes, in 1686, by which he prohibited the Protestant religion, making Catholicism obligatory.

Among his sons was James DeLancey (1703-1760) who, when but 30 years old, was made Chief Justice of New York, and later, presided over the first Colonial Congress. In turn, his son, James DeLancey II, was the man who became known as "the father of the New York turf." His tastes ran wholly along sporting lines, among which racing came first and cock-fighting second. —*Horse and Horseman.*

J. H. Skinner established the American Turf Register and Sporting Magazine in 1829 at Baltimore. The condition of the turf and of the Thoroughbred was described at that time as low, and is said to have been revived by the influence of the magazine "as if by magic."

A change is coming over American Polo

A subtle change is coming over American polo, and the cause of it can be found in the increasing desire of polo players to have the public pay for their fun.

In the old days, polo players participated in the game almost entirely for their own physical well-being and amusement, and for the enjoyment of the members of their families and close friends. Only occasionally—in such an event as the senior championship tournament, for instance—was the public invited.

Now, there's hardly a club in the country that doesn't want the public to come at 25 or 50 cents a head, or in the case of the open championship, at whatever the traffic will bear. Even individuals, like Pete Bostwick on his famous private field on Long Island, want the public swarming over their places at so much per copy, plus odd dimes and quarters for programs, white rock, coca cola, good humors, horsey souvenirs.

All this is called the "nationalization" or "democratization" of polo, and with it has come a marked change. Vast grandstands have been built. Press-agents have been hired, some at such figures that crowds have to come to pay for the press-agents, let alone for the members' polo. Loudspeakers have been installed to describe every play and radio broadcasts have been arranged for the more important matches; some announcers even whip up a little phony excitement to make the game more thrilling and thus entice new customers next week. Reporters and Western Union operators, who could hardly get into a first-class club in the old days, are now given a room for themselves and are, if not wined and dined, at least regularly sandwiched and liquored.—*Horse and Horseman.*

Gleanings from the K. S. C. Veterinary Seminar

Poultry have three turbinals, namely, a ventral, a middle corresponding to the dorsal of mammals, and a dorsal which is an extra one.

Poultry have a superior respiratory larynx corresponding in location to the larynx of mammals, and inferior larynx which is the true larynx or voice box.

In birds, dilation of the thorax during inspiration is in a supero-infero direction, rather than in a lateral direction as in mammals.

Sacks saturated with a mixture of molasses and arsenic, and suspended in stables, help to control flies.

In some abattoirs in Europe, measly pork and beef are sterilized by subjecting them to a temperature of -15° F. for a period of three days.

Dogs and horses are slaughtered for human food purposes in the same abattoirs with cattle in some European cities, though the meat of these animals is sold in separate establishments.

In birds there are nine pairs of air sacs divided into two groups, namely, the inspiratory group and the expiratory group. The inspiratory group consists of the greater and lesser abdominal sacs, and the expiratory group consists of the thoracocervical, anterior, and posterior thoracic sacs.

Fowls have two diaphragms, a thoracoabdominal and a pulmonary. The pulmonary diaphragm corresponds to that of the mammal in function and structure, but not in position. The thoraco-abdominal corresponds to that of the mammal in position but not in structure and function.

There are more women veterinary students in European than in American colleges.

In some European hospitals, chimpanzee blood has been used for human transfusion purposes.

So-called pregnancy disease in sheep apparently is the result of a hypoglycemia, and feeding starchy grains, especially oats, or the addition of molasses to other feeds seems to be a logical method of prevention.

Rabies and black tongue are not dissimilar clinically in the early stages, and care should be taken in the examination of suspected patients so as to avoid possible rabies contamination.

When the floor of the dog's mouth is involved in clinical evidence of black tongue, the prognosis becomes unusually grave.

It appears that in short-headed dogs, as compared with long-headed dogs, there is a tendency for reduction in the numbers of teeth that will be erupted. When they are erupted, many of the teeth either overlap or are rotated on their long axes.

Botulinus toxin is not absorbed from the crop in poultry. This was demonstrated by ligating the crop, both at its entry and at its exit, and then injecting the toxin.

Some of the present methods of parasite control in domesticated animals—pasture rotation, the use of vermifuges, etc.—may be supplanted by establishing an immunity in each host to the different species of parasites, especially in areas where the older control measures are impracticable.

Laparotomy and Rumenotomy in Cattle*

By T. H. FERGUSON, Lake Geneva, Wis.

LAPAROTOMY is an operation that we have made extensive use of in the past 30 years. Of course, it is the first step in any abdominal operation. It is not difficult to perform, but its performance must be carried out under as strict aseptic conditions as possible in order to leave a wound that will heal promptly and without serious complications. For whatever purpose it is performed, the standing position of the animal is by far the more favorable; especially is this so in such operations as exploring the abdominal cavity; ovariectomy; removal of new growths from the ovaries or uterus; torsion of the uterus; rumenotomy; and, frequently, cesarean section. Although a cesarean section in many cases must be performed while the animal is in a lying position.

Our technique for a laparotomy is to clip and shave, or simply shave, the hair from the left flank; cleanse the skin with alcoholic-mercuric chloride solution, 1 to 1000; or with tincture of iodine; anesthetize the skin by intradermic injection of 0.5% procaine or other reliable synthetic local anesthetic and the abdominal wall by subcutaneous injection of a 2 or 3% solution of the same anesthetic. Chloral narcosis is indicated to quiet the animal, especially if it is in a standing position. From a pint to a quart of 7% solution of chloral hydrate, depending on the size of the animal, may be administered with a stomach tube or given as a drench.

■ A laparotomy may be performed differently for various abdominal operations, but an incision in the left flank, beginning at a point between the last rib and the external angle of the ilium is the most common one. The height at which the incision is started depends upon the abdominal operation at hand. The length of the incision is also determined, to some extent, by that factor. In cesarean sections, the skin incision must be amply long, for the incision will not stretch, and it would be very embarrassing and difficult to have to enlarge it after one had started to remove the fetus through an opening that was too small. In all laparotomies, the skin incision at the lower part of the wound should extend beyond the incisions through the other tissues.

Commencing at the point indicated, the incision is carried down toward the midline through the skin to the desired length and through the abdominal muscles and then the fascia to the parietal peritoneum which is very sensitive. Before incising this structure, it should be swabbed with a 5% solution of cocaine, or a 3% solution of butyn. This not only desensitizes for the incision but facilitates suturing without pain when the wound is being repaired.

When one desires only to explore the abdominal cavity or to perform a spaying operation, the abdominal incision need no be more than six inches long. There should be just space enough for the arm and shoulder. However, for a rumenotomy, a cesarean section, or any abdominal operation where it is necessary to use both arms in the abdominal cavity, the incision should be considerably longer.

■ Closing the laparotomy wound may be brought about by two different methods of suturing. The classical way is to suture the peritoneum with the fascia and the muscles, using a twenty-day chromic catgut suture. Then lay a half-inch perforated drainage tube from the superior to the inferior angle of the wound so that it tends to obliterate the dead space in the muscle bed. This is easily brought about by placing a suture through the skin in the superior commissure of the wound, using a rather long thread. After the suture is pulled through the wound—the ends being equal on either side—pick up the center and pull out enough material to make two half hitches. Place these loops over the end of the tube—to fix it—in the center of the

*Presented to the 13th International Veterinary Congress, Zurich, Switzerland, Aug. 25, 1938.

wound. Then, with strong waxed linen, place stay sutures through the skin at least one inch from its edges. These sutures should be placed about two inches apart and tied after the edges of the skin have been approximated nicely with a continuous lockstitch suture. The interrupted or stay sutures are placed deeply through the skin. The parts should be drawn together snugly but without too much tension. Their function is to immobilize the tissues. We usually cover the entire wound and sutures with etherized iodoform and powdered boracic acid, or carbolized vaseline may be used. The sutures and the tube may be removed in from seven to ten days.

The other method of closing the wound serves very well and is convenient if one does not have the necessary sterile catgut. It consists in making figure eight sutures, using strong linen—preferably waxed—as suturing material. (We prepare our own suture material by boiling in a water bath, 90% beeswax and 10% phenol by weight. The suture material is dropped into this hot phenol and wax mixture and left until it is properly permeated. Then it is drained and dried. Before using, wipe off the excess wax with a clean towel). With this material, the suture is started through the skin about one inch from its edge on the right side and brought to the opposite side where the needle is pushed through the muscles, the fascia and the peritoneum of the left side and then through the peritoneum, the fascia and the muscles of the right side, and brought back through the skin of the left side about one inch from its edge. These sutures are placed about one to two inches apart, placing the lower one about two inches from the lower angle of the wound. These sutures are not tied until the edges of the skin have been approximated by a continuous lock-stitch suture to within one inch of the lower commissure of the wound. The figure eight sutures are then pulled sufficiently tight to bring the underlying part in as close apposition as possible without extreme tension. Through the lower 1½ inches that is not sutured, introduce under the entire sutured skin a piece of gauze that has been soaked in etherized iodoform. This should be packed in rather snugly. If necessary, one interrupted suture is put at the lower angle of the wound. This should be taken out 36 hours later when the gauze is twisted and removed from the wound. The external surface should also be covered with etherized iodoform and boracic acid powder—or with carbolized vaseline. Clean laparotomies performed in the field repair nicely with this management.

■ After a laparotomy, an exploration of the abdominal cavity may be made. The abdominal organs may be checked for foreign bodies, adhesions, new growths, abscesses and similar conditions. To facilitate this work, it is very convenient to be able to use either hand for checking the abdominal contents. Needless to say, such an exploration must be carried out in a careful cleanly manner to avoid unfavorable sequels.

■ Rumenotomies are the most frequent abdominal operation in our practice. We do these for the relief of impaction of the rumen with food of such character that it cannot be removed through a 1-inch or a

The first to describe intestinal surgery, at least in the English language, was Michael Harvard, an accomplished veterinarian of Dublin, Ireland. At the time this branch of surgery was unknown to the medical profession of Great Britain, although Harvard tells us that he had practiced it for 25 years. In discussing intestinal anastomosis and resection (in the horse) and cesarean section (which he did not originate) he describes laparotomy. Strangely enough, Harvard 266 years ago stressed cleanliness even as Doctor Ferguson stresses it today. He emphasized also expediting the operation and the avoidance of injury to the abdominal organs by rough handling, precepts that could well be more widely observed today.

1¼-inch stomach tube; in cases where, because of excessive fermentation, time will not permit emptying the stomach by the tube method. In cases of traumatic gastritis, the rumen is emptied, or partially emptied, to facilitate reaching into the reticulum which is the common location of at least one end of the foreign body.

Since the advent of the apron method introduced by Bardwell, rumenotomy can be made a very clean operation. The contents of the rumen are removed without soiling in the least the underlying tissues. Our favorite position for the operation is the standing one, when this is at all possible. But animals are often intoxicated to the extent that they cannot stand. This is especially true when the animal has acquired too much concentrated food by breaking into a cornfield, a granary or an apple orchard and has filled up to such an extent that the stomach has become enormously distended. The accompanying intoxication makes it impossible for the animal to stand. In such cases, our procedure is to do the laparotomy under the technique already described, pick up the wall of the rumen and anchor it to the edges of the skin by a continuous suture, using waxed linen or silk. After this is completed, make an incision into the rumen of suitable size to permit the passage of a six-inch embroidery hoop which has been placed in the center of a rubber sheet. After the hoop is pushed into the rumen edgewise and adjusted, the outside of the apron is spread over the animal's flank and a cross incision is made through the rubber engaged by the hoop. Then the process of unloading the rumen takes place. The contents are pulled out over the rubber apron until sufficient material is removed to permit a careful examination of the walls of the rumen to determine whether any foreign bodies are in that organ. After doing this,the hand is directed forward and downward into the reticulum and a careful search of that organ is made for penetrating foreign bodies.

In all rumenotomies, we carry out this procedure. Many times, when we have performed a rumenotomy as an emergency in the case of an overloaded stomach and have relieved the animal of the acute symptoms, we have found, upon exploration of the reticulum, pieces of wire and other materials lying loose in that organ which might, during any condition or circumstance that would cause severe compression of the abdominal walls, penetrate the stomach. We have found quite often in traumatic cases that, by removing the penetrant, sharp-pointed, metallic objects from the reticulum, the severe traumatic symptoms are relieved.

We have encountered also many cases where Nature could not incapsulate the infected portion, and the animal would not recover. On the whole, however, we have found the operation very valuable. Many valuable animals have been saved by rumenotomies. In hopeless cases, the animal is as good for disposal purposes after the operation as before, and the owner has the satisfaction of knowing he gave his animal every possible chance.

We have performed this operation a number of times in cases of thoracic choke on such hard substances as beets, apples, etc. We have found in such cases that we could relieve the animal through the stomach. We have also used the operation to remove placentas which have been swallowed after calving and which have caused loss of appetite and other symptoms of toxemia. In one or two cases we have found that part of the placenta lodges in the thoracic portions of the esophagus. After removal of the swallowed placenta, the symptoms of toxemia usually disappear.

■ When the object of the operation has been accomplished, the hoop is removed from the rumen and the incision is sutured. I have used both linen and catgut for this purpose with, apparently, equally good results. The Lembert suture is used. This brings the peritoneal surfaces in apposition. I prefer the continuous suture, burying the first row with the second; and, in some cases, the second row with the third. However, two rows are usually sufficient. The stitches that retain the rumen to the skin are then carefully removed and the

rumen allowed to drop back into the abdominal cavity.

During the entire procedure, care should be taken that the technique is carried out in a cleanly manner. Blood clots, etc., should be removed from the organ and field with dry, sterile gauze or cotton.

The usual laparotomy repair completes this operation. The animal is permitted to rest in comfortable quarters for a few hours before food is offered. In favorable cases, the animal will eat in from ten to 12 hours, when she should be fed sparingly with dry hay and allowed a reasonable quantity of water. We have cases in our practice that have undergone this operation, made nice recoveries, and are still functioning as dairy animals after as long as six years.

■ Laparotomy, exploring the abdominal cavity, and rumenotomy find constant use in cattle practice. These operations are not difficult and will save a good many otherwise hopeless cases. They have been well received and appreciated by my clientele.

Equine Concussion of the Brain and Fractured Axis

An eight-year-old, black, half-thoroughbred mare belonging to a National Guard cavalry unit was injured while being exercised. She had a history of having been nervous, flighty though not vicious, and that not infrequently over a period of years she had run into or banged her head on the stable wall, despite the fact that her eyesight was apparently normal. Otherwise so far as known she had been normal.

While exercising, this animal and three others, in the indoor polo arena, she collided with another horse. Both animals fell but the other rose immediately, unharmed. This mare staggered and fell unconscious.

When I arrived ten minutes later the following symptoms were noted: recumbency on the left side; body and legs immotile, except for an occasional foot movement; blood oozing from the left ear; eyes bulging, pupils widely dilated, eyeballs rolling. There was no corneal reflex. Breathing was 41 per minute, stertorous, and through the mouth. The heart beat could not be properly judged because of the position of the patient and the roaring of the breath. The pulse was 61, weak and irregular. No skull fracture could be palpated, although there was a bruise above the left eye.

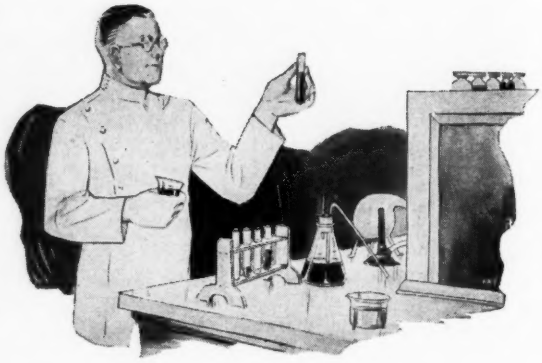
A tentative diagnosis of concussion of the brain was made. 150cc of calcium gluconate was given intravenously to act as a stimulant and possibly hydrogogue and thus relieve pressure on the brain. The effect was startling. The animal sat up twice, held the head erect, then crashed down on the left side. Extremely violent movement of the legs as though running ensued for about five minutes, then gradually subsided with only the right front leg moving, and even that one stopped after a time, then unconsciousness recurred exhibiting the same symptoms as before. Absolute quiet, blankets, and an ice pack on the head were prescribed. Blood, possibly from a cut tongue, now oozed from the mouth, so the poll was raised to prevent aspiration pneumonia. A spinal puncture to relieve brain pressure was mentally debated but vetoed due to the prevarious state of the patient and danger of herniation or collapse of the brain's ventricles if too much spinal fluid were withdrawn.

A second call was made six hours later, when no change in symptoms was found except a swelling and hardening of the muscles of the neck. 20cc ethereal camphorated oil and guiacol was injected intramuscularly, but no calcium gluconate for fear of repeating the morning's experience. Six hours later—12 hours from the time of injury—the animal died quietly and without regaining consciousness. The next day (12 hours after death) I made a postmortem examination on the head and neck. The axis was broken into five pieces, the left anterior articular surface being broken the worst. The spinal cord was not broken; a large blood clot, however, extended along the cord from the place of injury to the brain. The posterior fissures of the left cerebrum were full of clotted blood; some extended to the right side.

THEODORE E. JABBS

Clearfield, Pa.

Potassium Permanganate Reduction



POTASSIUM permanganate is readily reduced. The product of reduction is dependent upon the pH of the solution. In an acid medium the manganous form (Mn^{++}) occurs; in an alkaline medium the manganate form ($K_2O \cdot MnO_3$ or K_2MnO_4) occurs.

Normal milk is slightly acid, having a pH range of 6.2 to 6.8. In such milk the manganous form (Mn^{++}) occurs. The occurrence of this reaction in normal milk cannot be seen, but a fleeting glance of the transition can be observed. When the standardized reagent is added to normal milk a light violet tint is seen. The potassium permanganate soon changes to the manganous form (Mn^{++}), which is masked by the milk, and the resulting color is a pale cinnamon pink.

Abnormal milk has long been recognized as having a higher pH than normal milk. We call such milk alkaline. When the standardized $KMnO_4$ solution is added to such alkaline milk the manganate form occurs, and the color change is to a tint varying from a drab gray to clove brown. It should be noted that the degree of color reaction in abnormal milk is not entirely dependent upon pH. An important factor in this test is the reductive properties of the abnormal milk.

Solution Standards

Two solutions have been prepared for use in this test. The first is an M/40 aqueous solution of potassium permanganate (3.95 grams per liter). The test with this strength solution requires the mixing of 5cc of the fore milk with 1cc of the solution. The milk can be drawn directly into a marked test tube in the barn, and hence this procedure may be considered as a field test.

Where it is planned to make several kinds of laboratory tests on a large number of samples, an M/200 aqueous solution of potassium permanganate (0.79 grams per liter) has been found most convenient. To facilitate the preparation of the M/200 solution it is suggested that the M/40 solution be prepared to be used as the stock solution. By placing 200cc of the M/40 solution in a one-liter volumetric flask and then filling the flask to the 1000cc mark with distilled water, an M/200 solution may be prepared. This eliminates the necessity of weighing small amounts of the chemical, and therefore lessens the possibility of error in preparation where accurate scales are not available. With 1cc of the M/200 solution only 1cc of the fore milk is required for the reduction test. Great rapidity in performing this test on many samples is possible with the use of a Cornwall automatic syringe set to deliver 1cc.

Color Standards

A series of color standards for interpreting the color reactions obtained in performing the potassium permanganate reduction test may be expressed by the following shades, which range from a pale cinnamon pink to a dark clove brown. These shades have been identified with the following colors as given in Ridgway's *Color Standards and Nomenclature:*

*Published with the approval of the Director of the Wisconsin Agricultural Experiment Station. The writer wishes to acknowledge the courtesy of Prof. H. H. Sommer of the Department of Dairy Industry, University of Wisconsin in examining this article.

Test for Mastitis*

By E. R. CARLSON, Madison, Wisconsin
Department of Veterinary Science, University of Wisconsin

Color reaction number	Name of color	Plate No.	Line	Column
Normal	Pale Cinnamon-Pink	XXIX	f	13″OY-O
1	Drab Gray	XLVI	d	13‴OY-O
2	Light Drab	XLVI	b	17‴O-Y
3	Avellaneous	XL	b	17″O-Y
4	Wood-Brown	XL	b	17″O-Y
5	Saccardo's Umber	XXIX	k	13″OY-O
6	Army Brown	XL	i	13″OY-O
7	Verona Brown	XXIX	k	13″OY-O
8	Sepia	XXIX	m	17″O-Y
9	Bister	XXIX	m	15″Y-O
10	Clove Brown	XL	m	17″O-Y

In recording results the following code is suggested. The reaction may be expressed according to the color reaction number listed above. A reaction corresponding to color 1 would be expressed as +, color 2 as ++, color 3 as +++. If the shade is approximately between color 2 and 3, the record may be expressed ++P, etc. The color reactions most frequently seen in abnormal milk range from + to ++++++; in the more aggravated cases of mastitis the deeper shades are seen.

Discussion

The reactions seen in the reduction test both in normal and abnormal milk persist for a long time. The potassium permanganate reagent in the dilution employed is bacteriostatic, and therefore acidulation by bacterial action is slow. However, if the tested samples stand several days at room temperature, the color will gradually lighten. This phenomenon may be explained by the principle of the test, namely, when acidulation occurs the manganous form (Mn^{++}) develops.

Comparative reduction tests made both before and after heating milk samples sufficiently to destroy the enzyme catalase show that there is no change in the reaction, which seems to indicate that this enzyme is not an immediate factor in the test. As previously mentioned, an important factor is the reductive property of the abnormal milk. It has been suggested by Prof. H. H. Sommer that the reductive agent may be a protein fraction, possibly one with a sulphur group. Further studies are being conducted on various factors involved in the potassium permanganate test.

The evaluations of milk samples by the potassium permanganate test have been found to correlate with interpretations on the same samples by chlorine, catalase, and bacteriological tests. A correlation has been observed between the depth of the color reaction obtained in the potassium permanganate test and the degree of mastitis or degree of abnormality of the milk.

Observations indicate that this test has a place among the many tests for mastitis. It is inexpensive, and the solution is stable. No claim is made that the use of this single test can supersede combinations of the more widely-known tests. As in all other mastitis tests of a chemical nature, correlation with the lactation period and milk production of the cow will be advantageous in arriving at a correct interpretation.

Summary

A potassium permanganate reduction test for mastitis is presented. Two standard solutions for making the test, namely M/40 and M/200, have been prepared for field and laboratory use respectively. The color reactions obtained in the test have been identified with color standards given in Ridgway's *Color Standards and Nomenclature*. In the reactions of this test the depth of color is indicative of the degree of abnormality of the milk. A code for recording these reactions is also presented.

The chemical and microscopic tests of milk from animals suspected of having mastitis serve only to complement the information obtained from physical examination of the udder. Here is a reduction test, simple, inexpensive, informative, and best of all it can be made in the field at the time of the physical examination, when the information it reveals is most useful.

Shipping Diseases of Cattle*

By J. F. DE VINE, Goshen, New York

THOSE who had to do with shipping cattle 30 years ago, will recall that they were shipped almost solely by freight, rarely by express; and as there were no special laws governing their shipping, they were subjected to all kinds of privation and exposure. This frequently resulted in a whole carload becoming sick, and perhaps many dying, before reaching their destination. I have seen as many as eight dead and ten sick cows in a single car where the shipment had originated only 350 miles away, and this was a not uncommon occurrence. Naturally, most of the sick ones died after they had been unloaded and taken to the farm, which all too often meant virtual financial ruin to the owner, and provoked long, expensive, and exasperating lawsuits.

Years ago, this scourge was regarded as bad weather disease and stockyard infection. It was believed that exposure in stockyards, bad weather, and long train rides were necessary factors. In the East at least, no one seemed to hold the opinion that simply moving cattle a short distance, especially in pleasant weather, could seriously lower their resistance or bring on an outbreak of this infection. But the contagion has become so widespread and so virulent in character that even with the present shipping laws exacting that cattle be cared for humanely it is unsafe to ship cattle any considerable distance without first immunizing them, particularly if the weather is at all bad.

■ Formerly we gave but little attention to this contagion until we were well into the winter, but now we may expect an outbreak almost any time. We receive all sorts of reports showing how this plague may flare up on the slightest provocation when we have no particular reason to expect it.

For instance, late last spring, and on a rather pleasant day, I was called in consultation to a large dairy farm in Westchester County. The telephoned report was that a very valuable bull had just been brought down in a palatial truck from lower Massachusetts, a distance of about 200 miles. On arrival this bull showed distressed breathing, temperature of 107° F., and was bleeding from the nose and other orifices, which suggested either acute anthrax or acute hemorrhagic septicemia. Suspecting the latter we advised that the bull be put in the horse stable and not the dairy barn. On arrival, some three hours later, we found the bull dead. The autopsy and laboratory examinations showed that the animal had died from acute hemorrhagic septicemia. We could recite many experiences of this sort. Long trips seem to disturb the nervous mechanism and lower the resistance of our dairy animals, particularly of the purebred beasts, more than any of our other domestic animals.

May I repeat, this disease has now become so widespread that it is styled ubiquitous; all that seems necessary to bring it on is to lower an animal's resistance, or to expose it to particularly virulent germs, as for instance when sick animals are brought into a healthy herd. We have an analogous condition in the human family; it is generally known that the common cold and influenza are brought on either by exposure to particularly virulent organisms or by the lowering of body resistance by chills, hardships, or injudicious living.

■ In earlier days, we did not understand either how to prevent or how to treat hemorrhagic septicemia. We understand how to do both now. But prevention is by far the more desirable measure. For even if a dairy cow recover from shipping fever, her production is lessened for that season, and if she is heavy with calf, she may abort and not do well for the whole year.

There is just one safe and effective biologic preventive for this infection today, and that is bacterins. They are curative

*Condensed from an address over radio station WGNY, Chester, N. Y.

as well as preventive, and their action is stable and dependable. We always advise those who intend to bring cattle from a long distance to give two doses of bacterin, four or five days apart, before shipping; the second dose to be larger than the first, and a third still larger dose after the cattle reach their destination. For shipping a short distance perhaps only a dose of serum and a dose of bacterin are necessary.

■ An importer of Jersey cattle consulted us a few years ago, before importing some cattle from the Isle of Jersey. We advised him by all means to have the cattle immunized against hemorrhagic septicemia before leaving the island by giving them three increasing doses of bacterin, and suggested that he send bacterins to his Island veterinarian so that they might be administered about a month before the cattle were shipped. This was done. Other importers had cattle that had not been immunized on the same ship. Our client's cattle remained in perfect health throughout the voyage and while in quarantine. Other cattle on the same ship, which might in a sense be regarded as control animals, developed hemorrhagic septicemia to the extent of 32%, with a resultant high mortality. A subsequent importation, about a year later, by the same importer, following similar immunization, was again rewarded by freedom from disease, while hemorrhagic septicemia broke out in other lots of cattle on the ship. The proof of the immunizing value of bacterins could not have been more certain if these two experiences had been planned as experiments.

■ As to the curative value of bacterins, here is another actual experience:

A novice dairyman had bought around 150 cattle and moved them to his farm about 100 miles away with absolute disregard to immunization. Upon arrival at the farm, several sickened. The owner, believing the sickness contagious, got in touch with the county agent, who in turn contacted the state veterinary office, and they consulted with the state veterinary college; a representative of each visiting the farm. Their conclusion was that it was hemorrhagic septicemia. They suggested that serum might be tried, but gave the impression that there really was not much that could be done. So serum was given in a half-hearted way. Animals continued to die, and more sickened each day. After some 20 had died and about 70 sickened, the local veterinarian was called, and he at once telephoned our laboratories. We suggested massive doses of bacterin for the sick ones and immunizing doses for the exposed, and this treatment was carried out.

The veterinarian later reported that when the bacterins arrived some of the animals that had sickened more recently were carrying temperatures as high as 108° F., and that each day several of the sickest ones had died; in fact, three had died the day he telephoned our laboratories. On the day following the first injections every animal showed improvement and no more died.

I have been in contact with dozens of outbreaks similar in character to this one and know that where treatment is faithfully carried out most of the sick animals can be saved; but let me repeat, it is much better to prevent than to treat hemorrhagic septicemia. Prevention is the desideratum.

A refreshing thing about DeVine is his therapeutic optimism. He typifies the family physician of lamented memory in the medical profession. The presence of disease spurs him to energetic action. He is a do-something evangelist. While others were debating whether hemorrhagic septicemia of domestic animals was a fact, fad, or fantasy, DeVine acknowledged the pathogenic prowess of the bi-polar organism, gave battle, and saved his clients' animals. While others argued that bacterins could be of value only as a preventive, he cured with them. When the recognized dose was only 2cc to 5cc he gave 20 to 30cc, and patients figuratively picked up their beds and walked.

Bang's Disease Apparently Spread by an Infected Horse

The history of Bang's disease as disclosed by official test in a herd of cattle in Michigan is summarized in the following table:

Date	*Cattle Tested*	*Reactors*	*Suspects*
7-20-37	13	3	2
9-14-37	10	1	—
11- 8-37	7	1	—
1- 5-38	6	—	2
5- 2-38	9	4	—
6- 8-38	8	1	—
7-12-38	7	—	—
8-30-38	10	—	—

The problem of continued Bang's disease infection in this herd prompted special attention as to the possible source of such infection. The barn occupied by the cattle had been thoroughly cleaned and disinfected after each test and all yards were free of litter and manure. The owner kept a summer corral, not permitting the cows around barns and yards during the summer months. This had as an object determining if the contamination might be from the premises.

The sixth and seventh retests were applied during July and August after the cattle had been kept in the pasture and milking was in the summer corral so that there was no immediate contact with the yards and barns, this sanitary precaution apparently resulting in checking the infection. Further inquiry was made as to any other possible reservoirs of infection than the premises.

Investigation of the possibility of other animals being carriers or spreaders, such as dogs, chickens, hogs and horses, disclosed a horse on the premises affected by a fistula of the withers. This horse during certain periods had been incapacitated for work and allowed to run with the cattle.

This horse, a ten-year-old gelding, showed a swelling, first appearing on the right side of the withers in April 1937. It was opened in May. About three pints of greenish thick pus was discharged through the incision. In July of the same year, the left side was lanced. The horse was thus incapacitated for work and mingled with the cow herd as previously stated. Medicinal treatments begun at the time of the first lancing and continued through the summer and fall, resulted in a decrease of the discharge of pus. In December there was a complete cessation of such discharge.

At that time when the horse was examined the withers appeared normal except for a small hard spot detected by palpation. In March, 1938, the horse was put to work and in April, after severe hard labor a small swelling appeared in the region of the withers. This would appear and disappear every few days, increasing in size each time until finally the enlargement was lanced and pus again discharged. The horse was laid off from work, allowed to run with the cow herd, and treatment was again administered.

In August, 1938, a blood sample was taken from the horse and on agglutination test for Bang's disease, showed a four plus titre. Another test applied in September showed the same reaction. An unsuccessful attempt was made at time of last bleeding to collect pus for bacteriological examination.

The periods of the discharge from the fistula of this horse parallel quite closely the rise and fall of reactors to the Bang's test of cows with which the horse mingled when incapacitated for work. The reactors temporarily subsided in the winter when the fistula was healed, but broke out with a greater severity soon after the pus discharge occurred in May, 1938. The horse was removed from the barns and not allowed to mingle with the cattle following this second occurrence, with apparent good results obtained in stopping infection in the herd. This seems to suggest that the horse in question had been responsible in perpetuating Bang's disease infection in this herd.

This is the second rather clearly defined case observed during 1938 under coöperative Bang's disease work in Michigan, in which horses so affected may have constituted a reservoir of infection for this disease among cattle.

CHARLES D. LOGSDON
U. S. Bureau of Animal Industry.

Hog Cholera Prophylaxis

Is it good practice to give 80 to 100cc of anti-hog cholera serum to susceptible sows that are suckling two-week old pigs and two months later give serum and virus to the sows and the pigs?

Yes.

What would be the procedure if the sows and pigs are exposed to cholera thirty days following the administration of the serum to the sow?

Give serum and virus to sows and pigs.

Keratitis Prevalent in Swine

Some years ago several practitioners reported the frequent occurrence of conjunctivitis and keratitis in suckling pigs. This condition was relatively common as a sequel to or complication of other infections such as cholera and swine plague. In more recent reports conjunctivitis is also apparently common as a complication of erysipelas. The following description of porcine conjunctivitis as a primary condition is from information obtained from case reports and observations of affected animals.

Suckling pigs are most frequently affected. It is not unusual for a large percentage of the pigs in one lot or pasture to become affected within a few days. In one instance, several sows were affected with the disease and the following season 25 of the 75 pigs from the same sows became affected.

The first symptom manifested is a serous discharge from the eye. A close examination of a pig during this stage will reveal an intense congestion of the conjunctivæ. A few hours after the onset of the disease there is a mucopurulent discharge and the conjunctival mucosa is swollen and shows evidence of intensive inflammation. The mucopurulent discharge accumulates upon the margins of the eyelids and may cement the lids together. In extreme cases there may be ulceration of the cornea, or there may be a true ophthalmia and rupture of the eyeball.

The disease usually runs its course in from 10 to 20 days. The mild cases usually make a complete recovery; in the more severe cases cicatrices are not uncommon

Treatment.—Most cases respond to the topical application of argyrol after the membrane has been cleansed with sterile water.

VETERINARY MEDICINE will be pleased to have reports of other cases of primary porcine conjunctivitis.—*A. T. K.*

A Baffling Disease of Swine

I am writing with the hope that you may be able to offer some suggestions as to treatment for a disease condition I have encountered. There is here in eastern North Carolina a condition among swine that is of almost epizoötic proportions. It affects hogs that have been immunized against cholera both by serum alone and serum-virus, as well as hogs that have not been treated at all

I have tried the "flu" treatments, swine plague treatment, and Doctor Volkmar's bi-chloride-copper-iron treatment for amebiasis, both singly and in combination, and have used anti-hog cholera serum, bacterins, alkaline solutions in oats, sulfanilamide, and other remedies, but have had little success with any of these.

By removing sick hogs and employing good sanitation, alkalines, and bacterins, I have in most instances been successful in stopping the spread of the disease. In at least one herd, however, these measures seem to have been of no avail; the man has lost 80 of 95 animals and stands to lose more. After the hogs become sick I haven't saved 10% of them.

Symptoms.—Affected hogs run a temperature of 105-110° F. They are nervous with occasional spasms. Breathing is rapid, with a tendency to the abdominal type. The animals eat sparingly, if at all, and drink very little water. In the early stages they may be constipated; later a brownish, fetid diarrhea develops. They become weak and emaciated rapidly, and are very wabbly in the posterior parts.

Lesions.—On post-mortem examination, the most constant lesion is a pronounced inflammation of the large intestine, with a

bloody, false membrane adhering loosely to the mucous lining. This sometimes passes out with the feces. There are occasionally caseous abscesses in the cecum.

The lymph glands affected are congested throughout. In many cases the liver is enlarged and rather friable. An enlarged spleen, similar to that found in Texas fever, is often encountered. The inner lining of the bladder is usually hyperemic, and there is an ecchymotic hemorrhage of the stomach lining. Occasionally pneumonia and pleurisy are present, but in many cases the lungs are unaffected.

The small intestines, mesenteric lymph glands, and kidneys are usually normal, although there are sometimes a few petechiæ on the latter.

This condition, which spreads rapidly, first appeared in the hogs when they were turned in the soy bean fields or on sweet potatoes, but it has since appeared in lot fed hogs eating corn and fish meal.

Any suggestions you may offer will be greatly appreciated.—*J. W. W.*, North Carolina.

Comment.—It is possible that there may be three or four conditions occurring in the swine you describe, viz.:

1. Vitamin deficiency.
2. Swine erysipelas.
3. Bulbar paralysis.
4. Anaplasmosis-like disease.

Thus, diagnosis and control are complex problems. It is assumed that you have given consideration to the diet.

Acute erysipelas is a septicemia characterized by a high temperature and relatively sudden death and there may or may not be hemorrhages in various tissues, depending on how long the hog lives.

Swine erysipelas infection may be obtained from fish meal that has not been sterilized.

Bulbar paralysis is usually manifested by nervous disorders, disturbed locomotion, wabbly gait, a fairly high temperature, and there may or may not be diarrhea. They usually shrink rapidly. The percentage of fatality varies.

Anaplasmosis-like disease in swine is characterized by a moderately high temperature, anemia, icterus. This malady spreads slowly. On autopsy in addition to icterus and anemia the spleen is enormously enlarged.

The administration of Fowler's solution usually controls this malady.

The following suggestions may be of value in attempting to arrive at a definite diagnosis and institute control measures. The diet should be checked carefully. If fish meal is not sterilized it should, in my judgment, be withheld from the diet.

The administration of anti-erysipelas serum to acutely affected hogs should give evidence of the presence or absence of erysipelas.

Bulbar paralysis can be diagnosed positively by laboratory tests.

It would seem possible to ship specimens to the pathologic laboratory at Washington, D. C., if the specimens are wrapped in newspaper and packed in fruit jars with enough borax to absorb all moisture. Then pack the fruit jars in sawdust and cracked ice. In shipping specimens in extremely hot weather make arrangements to have the express messenger re-ice enroute.

Suggestions from readers of VETERINARY MEDICINE will be appreciated.—*A. T. K.*

Simple Treatment of Rectal Prolapse in Swine

In the January issue of VETERINARY MEDICINE, a method of treating rectal prolapse in swine was outlined. This article prompted Dr. W. K. York of Indianapolis, Ind., to suggest that the method of Dr. J. H. Mills of Russiaville, Ind., for the treatment of rectal prolapse be reported. The method as reported by Doctor Mills is as follows:

The affected swine are restrained and the exposed mucous membrane of the everted bowel is scraped; it then promptly flies back into the normal location. This method has been used by several Indiana practitioners with completely satisfactory results.

Bacterins Should be Given in Divided Doses

From observation and reports of clinicians, it seems very probable that fractional dosage of bacterins produces a greater resistance than one single dose, although the quantity administered in the one dose may be greater than the total quantity of the fractional dosage.

Some 45,000 horses and mules that were purchased in the Central Western states were given three fractional doses of equine anti-influenza bacterin before shipping to Spain. The loss incident to the shipping disorders was less than 0.5%. Before the adoption of the fractional dosage method the losses were much larger.

Many practitioners who formerly used the single-dose method of controlling swine infections have found that the results of fractional dosage of bacterin are far more dependable.

Peritonitis in a Boar

An interesting case of peritonitis secondary to obstructed circulation in the loop of the small intestine was observed in a two-year-old, 900-pound Poland China boar. The owner reported that the boar was stiff, had a tucked abdomen, and ate sparingly. He was kept in a lot, with free access to a shelter in which there was always ample bedding. He was given a maintenance ration of shorts and ground oats and well water to drink.

When this boar was first examined some disturbance of locomotion, evidence of constipation, and practically a normal temperature were noted. There was no occasion at this time for drastic treatment and the usual routine for cases with such symptoms was prescribed. The following day the symptoms were more pronounced. On the third day the boar had a high temperature and was not inclined to get up. On careful examination at this time the abdomen was found to be very sensitive. There had been practically no fecal matter eliminated, and an enema was given, but without benefit. Camphorated oil was injected, and castor oil was given by means of a dose syringe. The treatment was unsuccessful, and the hog died on the fourth day after the first symptoms were manifested.

On autopsy a loop of small intestine was found congested, edematous and necrotic, apparently due to obstructed venous circulation, and there was a general fibrinous peritonitis which was probably secondary to the lesion in the intestine.

A discussion as to proper methods of treating complicated porcine peritonitis would be of interest to readers of VETERINARY MEDICINE. The post-mortem examination showed that in the case reported, recovery was not possible.—*A. T. K.*

Sanitary Feeding Floors Are Economical

Feeding floors for swine have not been given sufficient attention by commercial swine feeders and some veterinarians have given little consideration to this important problem.

The old method of throwing corn out into feed lots is not only insanitary, but also wasteful and therefore expensive. Swine do not obtain the necessary quantity of feed under such circumstances, and they are forced to consume more or less filth, thus contracting a variety of infections.

That swine do not suffer more from digestive disturbances when fed in mud and filth is miraculous. Such feeding habits conduce to parasitic infestation, which is responsible for excessive losses in swine every year.

The idea that swine should be kept in filth is absolutely wrong, and is not in accord with the native habits of swine in the wild state.

It is not difficult to provide an economical and sanitary feeding floor on every farm. It is true that such equipment requires an outlay of some capital, but money so spent is a splendid investment. Some feeders prefer a board platform or floor, upon which the animals can be fed on the floor direct, in troughs or in self-feeders. However, concrete possesses advantages over lumber, be-

cause it is more permanent and in that the absence of crevices and cracks makes the floor far more sanitary. In the location and construction of a feeding floor convenience and drainage should be kept in mind. The top of the platform should be above the surrounding ground. The surface of a concrete floor should be left sufficiently rough to provide footing in wet weather. A platform 16x24 feet provides sufficient feeding space for 50 swine.—*A. T. K.*

* * * *

Actual figures on some swine feeding experiments last year show, on an average of 20 trials, that pigs of the same type, fed corn and a simple mineral mixture, made gains of 0.78 pounds daily; pigs fed this ration and tankage in addition, made a gain of 0.93 pounds daily. Pigs receiving corn and good pasture made a gain of 1.31 pounds daily and those getting corn, minerals, tankage and good pasture made a gain of 1.61 pounds daily.—*K. W. Stouder.*

* * * *

Two things in swine buildings are prolific in the production of swine influenza; one, cold drafts on the floor and the other, unventilated houses in which the air becomes very humid and the hogs become very warm while sleeping, then when they go into the open cold air to feed, they are prone to take influenza. Hog houses should have tightly-built, ventilating shafts not more than 20 feet apart, extending from above the roof to within one foot of the floor. The building should have low walls, not more than five feet high, and the ingress of air should be at the plate; that is, where the roof joins the side walls.

This will prevent floor drafts and at the same time, provide good ventilation. The opening for the hogs to enter and leave the building, at least in the northern half of the corn belt, should have a turn both inside and outside the building; a sort of runway shaped like the letter Z. This will prevent wind from any direction getting into the hog house. — *K. W. Stouder.*

Unfavorable Reaction After Vaccination in Swine

On January 3rd, 39 hogs were vaccinated with serum, virus, and mixed bacterin swine. These 39 had the run of the farm and were in the pink of condition. There were also vaccinated 26 other pigs that had not been out of the hog house. All showed symptoms of vomition and dyspnea shortly after the triple vaccination. The most severe reaction occurred in the 39 lot. Four hogs died.

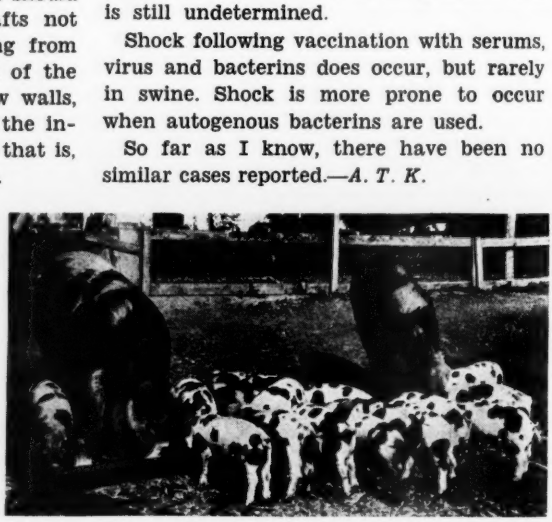
Three hogs from this farm had been autopsied on January 2d (the day before vaccination). One of these hogs had button ulcers and petechiæ of the kidneys. The other two were parasitic cases.

In addition to this herd, two other herds were vaccinated with the same serum and virus, and six other herds with the same serum but different virus. Also, three shotes were triple vaccinated. None of these experienced ill effects, so it would appear that the serum, virus and bacterin were probably not at fault. A sample of the mixed bacterin swine was tested for bacterial contamination in cultures and for toxicity by the injection of 1cc of the bacterin in a guinea pig, and all tests were negative.

The affected pigs were evidently sensitized, but what the sensitizing agent was is still undetermined.

Shock following vaccination with serums, virus and bacterins does occur, but rarely in swine. Shock is more prone to occur when autogenous bacterins are used.

So far as I know, there have been no similar cases reported.—*A. T. K.*



Impaction in Swine

It is not unusual to find impaction in swine where only one or two hogs are kept, but its occurrence in herds is rather uncommon. Doctor Stewart had such a case recently.

History.—The condition occurred after three or four extremely hot days in August in a herd of 60 shotes, weighing from 125 to 150 pounds. The swine had been raised on the farm and were running on a blue grass pasture.

Symptoms.—The first symptom was a general dullness and depression. Then the animals refused to eat, lay down frequently, and evidenced colicky pains by kicking their bellies. Some crawled upon the ground. Those which succumbed, usually died within 48 hours after the beginning of the attack. The owner called Doctor Stewart to administer serum and virus.

Autopsy Findings.—On careful post-mortem examination of the carcasses of two or three animals, the only pathological condition found was a marked impaction of the large intestine with dry blue grass. All other organs were normal; there being no evidence of hog cholera.

Diagnosis.—Impaction.

Treatment.—The swine were placed in a dry lot and all feed withheld for 12 hours. The pigs were then permitted to consume small quantities of soaked, chopped feed, in which was incorporated one ounce of bovine purgative per pig. They were then returned to a dry lot for observation. All recovered.

Comment.—The impaction was due to the fact that the normally green and luxuriant blue grass had been dried suddenly by the extremely hot weather; this dried grass had been consumed in large quantities by the pigs. The method employed in this herd deserves special mention. Had the owner's diagnosis been accepted and anti-hog cholera serum and virus administered, an excessive loss would no doubt have resulted. A sick hog is just about the poorest subject there is for a lightning diagnosis, and since herd treatment is usually involved, an incorrect diagnosis is quite apt to be very expensive for the owner and disastrous for the reputation of the veterinarian.

* * * *

Swine Enteritis and Bloody Diarrhea

Swine enteritis has long been with us in the corn belt. It is about as common as it ever was. As soon as the hog raiser lets down a bit in the sanitary management of his herd, the animals get the common form of enteritis, which I like to call pig typhoid.

However, in the last few years, we have had experiences with something else. The farmer buys stock hogs from somewhere, possibly from a community sale. He calls this new disease "bloody diarrhea." The situation is a bad one to handle. My experience has been that in the end, the loss of the herd is complete either by death or from damage to the animals so severe that the farmer does not get out of them even enough to pay for the feed.

We have never had an animal husbandry project that succeeded unless sanitation was a part of that project. There is nothing so discouraging as to have what appears to be a good breeding or feeding program under way and then have disease or parasites enter the picture and destroy all the good work done.—*K. W. Stouder.*

* * * *

Better Not Say—

"I operated the case the next day . . ."—One may operate a peanut roaster or even a horse car, but not a horse or other animal, and certainly not a case, which in veterinary medicine is an abstract term quite incapable of being operated, having its temperature taken, or being tested.

"The animal had no temperature . . ."—No one has yet been able to reduce the temperature of any object to absolute zero (-459.5° F.), so even a carcass held under refrigeration (—15° F.) to kill Trichinella cysts has a great deal of temperature; in fact, is hot enough to make liquid air poured upon it boil furiously, like water on a red-hot stove. No. The animal couldn't possibly have "had no temperature."

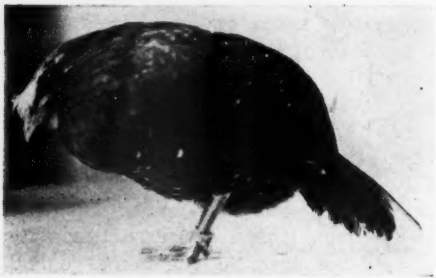
The Disease Factor in Illinois

THERE is nothing mysterious about it! Diseases of poultry do not drop from the sky. Flock owners not only permit diseases to develop, but often invite and encourage them by methods of management. Poultry diseases are like weeds; they thrive in a seedbed of bad management, and the harvest is another sad story. Chickens are sick because their environment is highly polluted; and many flocks collapse under the strain. In every farm flock a continuous combat is under way—health and profit vs. disease and loss. No other factor is of as great importance as disease in the struggle for poultry profits. The conflict wages each day of the year, and the outcome is all important. In fact, the battle often ends with a sudden knock-out blow before the flock owner realizes what is going on or how it happened.

The Author

A Four Million Dollar Problem

The results of investigations in various flocks show that disease problems change. Diseases of poultry uncommon a few years ago are widely distributed today, and an increasing number of flock owners with a past record of success are meeting with reverses due to disease. Few farm flocks boast of an annual mortality of less than 12 to 15%, while the yearly death rate in many flocks exceeds 40%. It is estimated that an annual loss in excess of four million dollars is sustained by Illinois flock owners from *preventable* diseases in their birds. However, disease can be held down by good management, which is the responsibility of the flock owner.



Fowl Typhoid

Diagnosis Essential

If disease appears, a correct diagnosis is the first essential. In appreciation of the importance of this fact in curbing losses, flock owners have for many years had the assistance of local veterinarians, as well as of animal pathology laboratories at agricultural colleges. The purpose has been twofold: first, to assist flock owners with their immediate problem and second, to accumulate accurate information regarding the nature and extent of poultry diseases in an attempt to formulate a simple, practical program of combating poultry mortality in farm flocks.

6,800 With 7,951 Diseases

Investigational studies in poultry diseases at the Illinois Agricultural Experiment Station, in coöperation with flock owners and veterinarians under Project 1219, emphasize that each flock represents an individual problem involving the flock owner and the flock. However, the guideposts to prevention of poultry mortality are repeatedly suggested in results of autopsy studies on specimens from typically diseased flocks. In 6,800 sick fowls submitted from approximately 6,000 widely distributed farm flocks in Illinois was found the "inside" story for every flock owner. A total of 7,951 disease entities, parasitic, bacterial, filtrable virus, protozoan, fungous, and nutritional, were encountered in the 6,800 birds.

Internal Parasitisms Most Prevalent

The "mystery" of poultry diseases is dispelled in these findings. Two thousand seven hundred and thirty-eight cases, or 34.4%,

Poultry Mortality

By ROBERT GRAHAM, Urbana, Illinois,
Department of Animal Pathology and Hygiene, University of Illinois

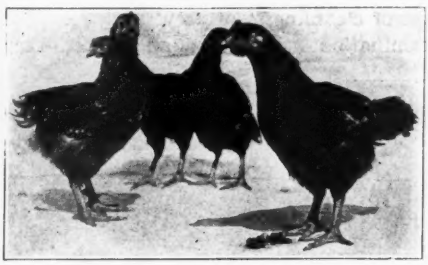
were intestinal parasites of various kinds. Parasitic infestations point very definitely to contaminated feed and water. In some rural localities the incidence of intestinal parasitism is even higher, approximately 50%. Further analysis of these data indicates that tapeworm infestation constitutes 47% of the intestinal parasitism of poultry in Illinois flocks. Thus it can be said that approximately 20% of the total poultry disease problems in Illinois farm flocks, as observed at the autopsy table proved to be some form of tapeworm infestation, notwithstanding that tapeworm infestation was first reported in Illinois farm flocks less than 20 years ago.

The Bill for Tapeworms—$800,000

Though widely distributed, the presence of intestinal parasites in a flock often escapes the attention of the owner until the injury has been done. They lower production, cause unthriftiness, emaciation, and death. Also, indirectly, worm infestations lower resistance and make fowls susceptible to colds, roup, and other contagious diseases. The precise loss from parasitism is hard to appraise, but together with the indirect loss it represents an important part of the increasing mortality in poultry. Figured on the basis of the total mortality due to disease, tapeworm infestation in poultry entails an annual loss of approximately $800,000 in Illinois.

Success by Prevention

Autopsy findings, supported by field observations, teach that prevention of tapeworm infestation, as well as of other intestinal parasites, is relatively simple and is more economical than cure. In fact, many poultry diseases are incurable. The approach to the problem is through prevention, not medication. In order to apply the essential measures of good management, there must first be an understanding of their great value. Failures are invariably traceable to lack of appreciation followed by faulty or indifferent application of simple sanitary

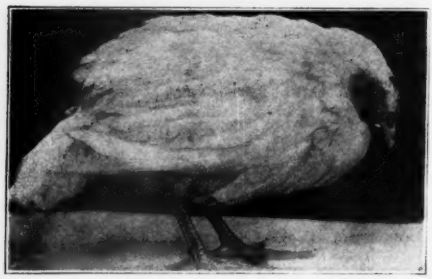


To accept and encourage poultry practice or to discourage or refuse it is a question that confronts most general practitioners of veterinary medicine. There are valid arguments both for and against it. The need of the poultry industry for skilled veterinary service is greatest of any branch of the livestock industry; but the realization of this need is less in this field than in any other. Some special knowledge is required for poultry practice; this is, however, easy of attainment by any qualified veterinarian. Although in the main the fees are small, many have found poultry practice profitable. It takes time and considerable effort, but lends itself well to spare time work, and it tends to increase one's other practice. One thing is indisputable: if a practitioner neglects, discourages, or declines to serve the poultry industry in his locale he should not complain because the unqualified undertake it; nor rail at remedy peddlers and hatchery men even though they gradually extend their activities, as many of them will, to the care of their clients' other animals; in time becoming all-around quacks. He has invited just that.

measures, rather than to shortcomings or defects in those measures.

Roundworms

Roundworms of poultry generally have a direct cycle from host through environment to host. Their suppression is a matter of cleanliness; of preventing fecal contamination of the feed and water. Clean



A White Leghorn Cockerel Infested with Head Lice

houses, fresh uncontaminated ground, clean well-balanced rations, and pure water are the essential features in preventing roundworm infestations.

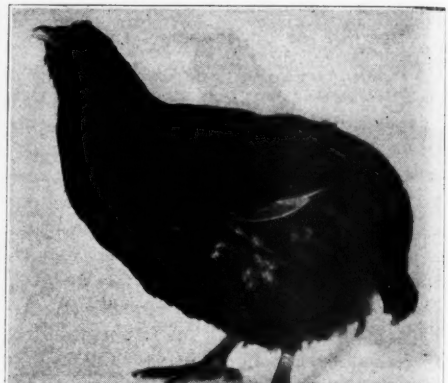
Break the Life Cycle

Tapeworms offer a little different problem. They have an intermediate host. The eggs, in droppings of infested fowls, are eaten by termites, snails, house flies, stable flies, dragon flies, butterflies, grasshoppers, sow bugs, water fleas, amphipods, slugs, beetles, and ants. Upon these infested hosts being in turn ingested by chickens, mature tapeworms are developed. In preventing tapeworm infestation the cycle of infestation can be broken by proper drainage, proper manure disposal, and through the application of the same sanitary measures suggested for roundworms.

The panacea for diseased farm flocks is simply clean ground, clean houses, clean rations containing the essential nutrients, and water free from contamination. There is no short cut or substitute. If disease appears, a correct diagnosis should be secured, clean-up measures instituted and sick chickens promptly destroyed and buried. There is no vaccine, no mineral mixture, no worm remedy that will prevent or correct the damage from tapeworm and roundworm infestation in poultry. In fact, if remedies were the solution of the worm problem in farm flocks, the use of these materials would have solved the problem long ago, for they have been used and are now being used by the carload and all the time the loss in poultry flocks from intestinal parasites has been increasing.

Each Flock a Separate Problem

It is suggested that flock owners give consideration to the type of soil, drainage, type and construction of the houses, the size and character of the range, and other details of management which influence health. The following simple steps in management have given the best results in avoiding the pitfalls of disease and poultry



Hen with Infectious Laryngotracheitis

mortality. Their effectiveness cannot be questioned.

1. Select vigorous, healthy breeding stock.
2. Clean ground, clean house, clean and well-balanced rations, and pure water.
3. Daily flock inspection.
4. Prompt destruction and burning of sick chickens.
5. Replace dirt floors in houses with board or concrete.
6. Avoid over-crowding.
7. Clean and disinfect the house at proper intervals.
8. Avoid continuous feeding of medicine or medicinal preparations.
9. Secure a correct diagnosis if disease appears.

The Practical Slant in Teaching

I was interested in the article "Anatomy and Teachers of Anatomy" which appeared in the February issue (*Vet. Med.* 32:2, p. 62). It is profitable to all of us to heed the comments that others make.

I fully agree with the writer, and in my classes I always try to make practical applications of some structures as occasion seems proper. In our laboratory notes it frequently asks, "Of what surgical importance is this?"

Frequently we may read a case report from one of the veterinary journals, especially if a picture accompanies it, for example, the rupture of the peroneus tertius (flexor metatarse) muscle, or the rupture of the prepubic tendon. We keep an index of those cases.

We also try to give students the synonyms of the most common structures. Whenever we notice some of the older nomenclature used in the journals, we also draw the attention of the student to the fact that possibly they may have some such words in a state board examination. Those synonyms are familiar to those of us who graduated before Sisson published his second edition. Now, the name "glossofacial," for example, does not have a place in the list of arteries of the horse in Sisson.

Possibly the reason some teachers of anatomy do not speak of the surgical phases as stated in the article referred to above may be because they have devoted their time exclusively to anatomy. I think the best teacher is one with a varied or general experience rather than one who has specialized on one subject to the exclusion of all others.—*J. H. Burt.*

Comment.—It will be hard for this generation of American veterinarians to entirely overcome the confusion that arose by the publication of Sisson's excellent anatomy of some of the domestic animals which was a varitable raid upon the traditional terminology handed down by Bourgelat, Chauveau, and the English authors, not to mention the German and Italian veterinary anatomists, none of which are in accord in the matter of nomenclature at this period of veterinary history. While we are not unaware of the finesse of classical anatomical baptisms, it is evident that even Sisson was not daring enough to entirely ignore the allure of the quadruped in setting down personal ideas which neither agree with contemporary anatomical terminology nor entirely abolish the old nouns and adjectives that have been used since veterinary medicine began to re-form in the latter part of the 18th century. When one compares the voluminous tomes of Porcher, each covering one of the domestic species, with the book the American student must venerate, it is quite evident that the confusion mentioned by Professor Burt will be enduring. The percentage of American veterinarians who are more familiar with the old than with the new words is not known, but that it still runs high is shown in state board examinations where examiners who know only the new terminology unjustly baffle prospective licentiates into frenzy with names they never knew.—*L. A. M.*

President-elect of the A. V. M. A., Cassius Way, New York, has just recovered from a severe attack of inhalation pneumonia following an operation for gastric ulcer.

Discussing ways to interest and instruct students a writer in Science stated recently:

In actual practice undergraduates respond eagerly when asked to walk occasionally in the footsteps of the great masters of the past. Many of them get from the experience "a sense of unlimited possibilities, of adventure and of exultant hope."

Canine Distemper and Vitamin A of Shark Liver Oil

By D. A. SANDERS and L. L. RUSOFF, Gainesville, Florida,
Florida Agricultural Experiment Station

THE importance of vitamins in the nutrition of animals is recognized by scientists everywhere. In recent years the presence of certain vitamins in the food of animals has been associated with the prevention or cure of some infectious diseases. It has been determined that the presence of vitamin A in the food of animals assists in maintaining the integrity of normal epithelium of the respiratory, digestive, genital and urinary organs, thus affording a degree of protection against infections of these tissues. Vitamin A has been, therefore, designated the anti-infective vitamin. Carotene and cod liver oil have been utilized as sources of vitamin A in such studies. Shark liver oil has been found to be a rich natural source of vitamin A and was used as a source of vitamin A in this experiment.

■ Scheunert and Petzold[1] fed two pregnant bitches irradiated yeast during the last days of pregnancy and until the pups were weaned. Distemper could not be induced in the pups whether or not they had received irradiated yeast. Pure vitamin B_1 had no curative value when administered to dogs ill with distemper. The daily administration of cod liver oil did not prevent conjunctivitis, rhinitis, or corneal involvements usually associated with canine distemper. The authors stated that their experiments do not allow the assumption that distemper is in any way associated with the lack of vitamins.

Frohring[2] fed puppies a diet with liberal supplements of vitamins. Carotene in oil, which was fed up to 25,000 units daily, was given as the source of vitamin A, while dried yeast supplied vitamins B_1 and the B_2 complex. The supplements were administered to the pups 30 to 60 days before they were exposed to canine distemper. It was impossible to transmit distemper to these animals by exposure in distemper wards of veterinary hospitals in Cleveland. This led him to the conclusion that much of the disease among dogs in that city, although clinically indistinguishable from virus distemper, is not related to Carré's virus. Schlingman[3] had previously reported that a similar situation occurs in Detroit. Frohring's puppies were also given injections of commercial distemper virus. From this he drew no conclusions on the ground that the number of puppies injected (25) were too few. However, the inference is that not all distemper virus used in the vaccination of dogs against distemper is active. Frohring concluded that vitamin deficiencies are responsible for 90% or more of the difficulties usually encountered in rearing puppies, i. e., that a great majority of the disease of puppies and young dogs ordinarily called distemper and clinically indistinguishable from distemper is due, not to Carré's virus, but, primarily, to nutritional deficiencies, and secondarily, to the same type of secondary invaders prone to follow virus infection.

Russell[4] stated regarding vitamin A: "It is an anti-infective vitamin to the extent that when enough is present to maintain normal epithelial linings the chances of invasion by disease organisms are lessened, but no satisfactory evidence has ever been presented that the feeding of an excess of this factor develops a still greater resistance to disease invasion. The simplest and most fundamental fact that can be stated with regard to the relation of vitamins to disease is that a given vitamin will cure only the disease condition caused by a lack of that vitamin."

■ During the past few months opportunity has been afforded for making observations

on the vitamin A of shark liver oil and canine distemper along similar lines to those conducted elsewhere. The study here reported was designed to determine whether or not the addition of shark liver oil to a presumably adequate ration would increase the growth rate, improve the condition of pups, or increase resistance to the virus of canine distemper.

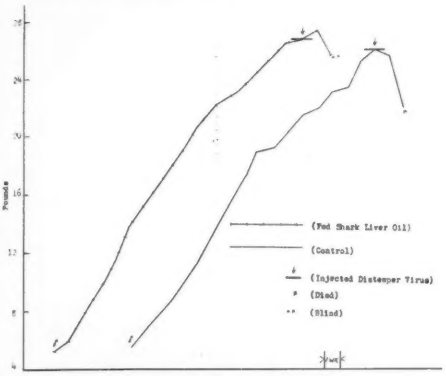


Fig. 1. Growth curves of puppies (Litter 1) on a commercial dog food with and without shark liver oil supplement.

Procedure.—Thirteen pups and two adult female dogs were used in this study. The pups were of different breeding and represented four different litters. Litter 1 consisted of two male mongrel pups, offspring of a registered chow; Litter 2 comprised five mongrel pups; Litter 3 was represented by one spitz pup and Litter 4 consisted of five mongrel pups. Eight of the pups, representing three litters, were reared in the Experiment Station kennels; Litter 2 was secured at the age of three weeks. The collie mother of Litter 4 was also used in the experiment, and another adult female dog was introduced into the kennel during the latter part of the experiment.

All the dogs were confined outdoors under ideal conditions in a run designed especially for the purpose. Suitable shelters were provided where the animals could avoid exposure to inclement weather or hot sunshine. All animals received similar management. After weaning, the pups received a daily ration consisting of commercial dog food which was guaranteed by the manufacturer to contain 4,000 units of vitamin A per pound. Growth curves of the various litters are given in figs. 1 to 3.

Six puppies, representing at least one from each of the four litters, were fed *per os* five to 20 drops of shark liver oil daily.* The shark liver oil supplement was administered to four of these pups from the time of birth until the end of the experiment. Two pups were given the supplement of shark liver oil, beginning at three weeks of age. The amount of oil administered depended upon the age and size of the pup. As the pups increased in size and age the higher levels of oil were administered. Representative samples of this shark liver oil assayed over 15,000 U.S.P. XI units of

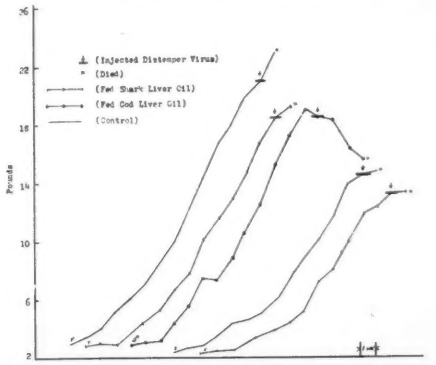


Fig. 2. Growth curves of puppies (Litter 2) on a commercial dog food with and without shark liver oil supplement.

vitamin A per gram at the Nutrition Laboratory (Rusoff, unpublished data). One pup received a tablespoonful of commercial cod liver oil concentrate daily.

The remaining six pups from these litters and the adult collie served as controls

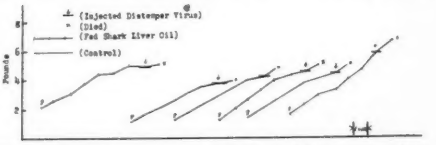


Fig. 3. Growth curves of puppies (Litters 3 and 4) on a commercial dog food, with and without shark liver oil supplement.

and received no supplement of shark liver oil. The six pups which received shark liver oil and the pup receiving commercial cod

*The shark liver oil was furnished through the courtesy of Shark Industries, Inc., Hollywood, Florida.

liver oil concentrate exhibited vigor and a characteristic general appearance above that of the control animals.

When the pups were between 10 and 20 weeks of age they were exposed to the virus of canine distemper.** The virus was shipped in the form of portions of frozen, distemper-infected spleen tissue, and was received in refrigerated form. Immediately upon arrival the distemper-infected spleen tissue was triturated with sterile sand. Sufficient physiological saline solution was added to make a 20% suspension. The material was filtered through sterile gauze. Each of the experimental pups received intramuscular injections of 0.5cc of the filtered suspension. The adult female collie was given an intramuscular injection of 1cc of the virus.

Result.—The body temperature and general condition of each animal were observed twice daily from the time of injection. All 13 pups showed symptoms of canine distemper infection in from three to five days after exposure. Symptoms of canine distemper which occurred following injection of the virus consisted of weakness, inappetence, elevation of body temperature, conjunctivitis, serous and mucopurulent discharges from the eyes and nasal passage, diarrhea, blood coagula in feces, corneal opacities and ulcerations, and blindness. Eleven of the 13 puppies died within two weeks after the injection. Autopsies of these puppies showed definite lesions of canine distemper. The temperature curves are given in Figure 4. During the course of the disease an adult female spitz was introduced into the kennel and given large doses of shark liver oil. This animal contracted distemper and died. The adult collie which reared Litter 4 was immune to distemper and showed no reaction following the injection of canine distemper virus.

**The canine distemper virus was supplied through the courtesy of Lederle Laboratories, Inc., Pearl River, N. Y.

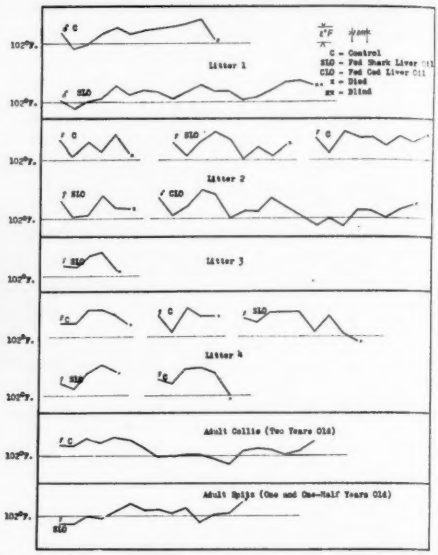


Fig. 4. Daily temperatures of puppies after injection of distemper virus.

These results show that vitamin A present in shark liver oil did not protect puppies against injections of canine distemper virus. No difference was noted in the susceptibility of the control and shark liver oil groups to injection of canine distemper virus. The temperature curves show that all 13 puppies had a significant rise in body temperature following exposure to distemper virus. These results are not in agreement with Frohring's, in which only one pup died of 25 that received excessive amounts of vitamin A and were inoculated with an untested virus of canine distemper.

These results are in no way to be construed to minimize the importance of vitamins in the nutrition of animals.

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The Rabies Problem

By EARL BAUMWELL, New York City, and ROGER GROSSMAN, Chicago, Illinois

ONE of the outstanding problems that workers in public health must solve is that of rabies. The violent and terrifying symptoms which characterize it, the extreme suffering which it inflicts on its human victims, as well as the inevitable fatal terminations, have from early times gained for the disease a wide, popular interest.

Rabies has been known since the earliest times; in fact, it is one of the oldest known diseases affecting animals. In the books of Susrata, the earliest Hindoo works dating about six centuries B. C., there is mentioned a disease of wolves, dogs, foxes, jackals, tigers, and bears, characterized by foaming at the mouth, and snapping and biting other animals, including man.

In the Iliad, Teucer speaks of Hector behaving like a raging dog, and Ulysses says of him, "So with a furious lyssa (rabies) was he stung." Plutarch asserted that it was first observed in mankind in the days of the Aesculapiadæ, the descendants of Aesculapius, the god of medicine. In the 13th century B. C., Acteon, son of Aristeus, is reported to have died of the disease. Democritus gave an account of it in the 5th century B. C. In the 4th century B. C., Aristotle stated: "Dogs suffer from madness which puts them in a state of fury, and all animals which they bite when in this condition become also attacked with madness." Celsus, in the 1st century A. D., was the first to describe the infection in man, using the term *hydrophobia*.

Other writers of that same period and in the later centuries mentioned rabies. In 1271 A. D., it is related that 30 persons perished from bites inflicted by rabid wolves which invaded a town in Franconia, attacking people, herds, and flocks. In Paris in 1604, an epidemic of rabies assumed considerable proportions. Lord Byron, in one of his early poems, mentioned the fact that the saliva of a rabid dog is infectious. In 1770, the paralytic form of rabies was recognized in man. In 1804, the infectiousness of the virus in the saliva of a rabid dog was established by rubbing it into the wounds of various animals, many of which developed the disease. Since that time, great advances in knowledge of the disease have been made.

■ Rabies is a disease which is world-wide in distribution. It occurs in all warm-blooded animals, but its presence in dog and man is the phase which must receive the utmost consideration. Domestic birds, although susceptible to a degree, rarely contract the disease in the natural manner. This is due probably to their higher body temperature.

The dog is subject to two types of rabies, furious and dumb. The furious form is most prevalent among the domestic animals. Horses that are affected become vicious and impossible of control. Cattle and sheep charge at objects, and a change of voice is noticeable. They do not, however, bite; whereas hogs gnaw foreign objects, even to the point of tearing out their front teeth. Hogs also swallow foreign material and will not feed. The symptoms in the cat are similar to those in the dog. Dog and man are equally susceptible to the two forms of rabies.

The incubation period of the disease is extremely variable; however, the majority of cases occur within the following periods:

Man	2 weeks to several months
Cow	4 to 8 weeks
Sheep	3 to 4 weeks
Swine	2 to 3 weeks
Dog	3 to 6 weeks
Cat	14 to 16 days

Rabies has been a very important problem to the owners of livestock in various parts of this country. In West Virginia, in 18 months, there was a loss of $50,000 in livestock. Within 100 miles of Charleston, 176 head of cattle died of rabies, besides

many sheep and hogs. More important than its presence in other domesticated animals is the presence of rabies in the dog. The dog is the chief source of spread of the disease among the domesticated animals and man.* The incidence depends upon the control of the dog.

Rabies is a disease which does not choose any particular breed, sex, or age of dog. It may be prevalent at any time of the year. It is found more often in young puppies than in the older dogs, but this may be explained by the increased pugnaciousness and activity of young dogs. The fewer cases in the winter months may be explained by the greater confinement of dogs at that time. The incidence seems to be on the increase in the United States, inasmuch as an increasing number of cases is reported each succeeding year. Rabies is not indigenous in Holland, England, Ireland, Sweden, Australia, or Hawaii. Ireland has had no case for 30 years; Sweden has had no cases since 1886. Other countries, such as Belgium and Switzerland, have had very few cases, with only one human death in Switzerland in the past 35 years. In other countries, such as France, Germany, Austria, Italy, Egypt and the Philippines, the disease is common. Russia, Spain, Arabia, Siam, India, Japan, China, and the United States have the worst rabies situations in the world. In the main, rabies is more prevalent in those parts where civilization is retarded and poverty prevails, or where, as in the United States, quarantine regulations are most difficult of enforcement.

■ The incidence of the disease has been erratic, but in Ohio, for example, it is now nearly four times as great as it was 20 years ago.

The number of cases in man in a country follows closely the prevalence of the disease among the dogs of that country. The number of people who take the Pasteur antirabic treatment is each year becoming greater. At least 55 lives were lost in Illinois in the past 10 years, due to this disease. In the past 20 years, 61 persons died of rabies in Ohio. In the three years 1933, 1934, and 1935, five counties in Ohio reported 3,207 persons given the Pasteur antirabic treatment, at an expense of $52,682.00. The cost of rabies prevention in New York City is about $100,000 annually. There were 69 human deaths in that city between 1908 and 1934. There were 65 deaths from rabies in this country in 1934. However, the number of deaths has not increased in 14 years. This is no doubt due to the greater activity of public health commissions in endeavoring to persuade all exposed persons to take the Pasteur treatment.

Cases in Franklin County, Ohio

Year	Positive	Negative	Total
1932	1	10	11
1933	1	17	19
1934	2	13	15
1935	5	19	24
1936	21	19	40
1937*	38	55	94
Total	68	133	203

*January-June.

No country need tolerate rabies. The veterinary profession for a generation has possessed all the information necessary to banish this most dreaded of diseases. Yet in the United States rabies has not only been tolerated all along but has been allowed to increase steadily. Its cost in animals and in the expense of Pasteur treatments totals millions of dollars annually. Its cost in human suffering, fear, and apprehension is incalculable. The chief sufferers from rabies are dogs and the heaviest financial cost falls upon those who breed dogs for sale and who cater to their needs—the dog industry. Rabies is the greatest single deterrent of a wider, a much wider ownership of dogs in this country. It supplies the opponents of the dog with their most forceful argument.

* The infectiousness of milk of rabid cows has been suspected. However, there is no proof of this. Theoretically, any affected animal may communicate the disease to other animals and occasionally all of them, or nearly all of them, do; practically, however, the dog is the only important spreader of the disease in this country, since rabies promptly dies out in other animals, even in coyotes, and is perpetuated only by dogs. In South Africa the mongoose and in South America the vampire bat perform this rôle.

■ In man, the incubation period varies from two weeks to several months, with an average of about 70 days. As in other animals, the period depends upon the location of the bite and its severity. Not all persons who have been bitten by a rabid animal will develop the disease, even if they be untreated. The Pasteur Institute in Paris shows that only 16% of such persons succumb to the disease. Women have a shorter incubation period generally than men, and children an even shorter one.

The diagnosis of rabies in dog and man depends upon:

1. History of exposure.
2. Length of period of incubation.
3. Symptoms and course.
4. Termination.
5. Post-mortem findings, macroscopic and microscopic.
6. Inoculation tests upon animals.

History of Exposure.— In man, this is more readily ascertained than in animals. In the dog particularly there may be no knowledge of exposure, and diagnosis may have to be made wholly upon other evidence.

Length of Period of Incubation.—This is important in the differentiation between hysterical manifestations simulating rabies and the true disease. The former usually come on within a few days of exposure and are induced by seeing, hearing, or reading of the disease.

Symptoms and Course.—This is by far the best criterion upon which to base a diagnosis. Rabies is rarely atypical and it is not often that measures other than observation are necessary for definite diagnosis, if there has been an opportunity for observing the suspected animal for as much as 24 hours. It is best, however, to affirm insufficient observation by laboratory examination, which may confirm but can never negative a positive diagnosis made clinically.

Termination.— The uniform fatality of this disease within a few days of the first sign of the symptoms' appearance may help in diagnosis.

Rabies

Post-Mortem Findings.—These are inconstant and not absolutely characteristic. The most important phenomenon, if present, is the "Negri bodies" in the brain. Their presence is clearly diagnostic of rabies. They are not, however, always present or at least demonstrable in cases of rabies, but are found in about 90% of the brains of rabid animals.

The finding of foreign material in the dog's stomach may be suggestive of the disease, but certainly is far from conclusive even if other nervous symptoms have been present. However, taken in conjunction with an inflamed condition of the larynx and discrete areas of inflammation in the intestinal walls, it is of considerable diagnostic value. An incriminating history and a general dilapidated appearance of the carcass, together with the gross lesions mentioned, justify a positive diagnosis.

Inoculation Tests upon Animals.—This is the final resort in diagnosis. Answers to a questionnaire sent to state laboratories showed that five of these inject all Negri negative material into rabbits or guinea pigs. Five others do it occasionally. Rabbits subdurally inoculated usually come down during the third week; guinea pigs as early as the twelfth day or earlier. The disadvantage of this animal test is the long period which must elapse before definite information is obtained. During this interval the human subject, having been exposed, has probably been subjected to daily injections of the vaccine. These are not

pleasant, to say the least. Then, too, the patient must suffer the anxiety and fear which accompany any dog bite.

Drs. Webster and Dawson of the Rockefeller Institute for Medical Research have reported a new test which may prove helpful in solving the problem. They have developed a strain of mice which is highly susceptible to neurotropic viruses. This special strain of white mice, four to six weeks old, is injected intracerebrally with a brain emulsion from the suspected animal. The mice usually die within a week if the suspect was rabid. Symptoms in the mice are sluggishness, roughened fur, loss of hair, photophobia, conjunctivitis with a seropurulent discharge, paralysis, convulsions, and death within 48 hours after the onset of paralysis.

■ The important question arises: "How can we prevent and control rabies?" The answer lies in a few principles:

1. Solution of the stray dog problem.
2. Annual vaccination of all owned dogs.
3. Enforcement of licensing, muzzling, and quarantine regulations.
4. Control of all wild carnivora.*
5. Education of the public to the problems of the disease.

Solution of the Stray Dog Problem.—This is the most important measure in the elimination of the disease in a community. Rabies is peculiar in that a town or city cannot, by its own effort, eradicate it without the coöperation of all the surrounding communities. A southern county in Ohio reports the case of a rabid dog traveling 30 miles from its home before it was cornered and killed. This dog bit 10 persons, and at least 50 animals were known to have been exposed. Countless similar examples could be cited.

The traveling mania of the rabid dog is an evident reason for the necessity of coöperative effort among neighboring communities. The stray dog is undoubtedly the spreader of the disease among animals in the majority of cases, although owned dogs are responsible for the majority of exposures in man. Why shouldn't these stray dogs contract rabies more frequently than privately owned dogs? They are bold, unafraid, cover more territory, and come in contact with more dogs. Furthermore, as a group, they are never vaccinated against rabies. Doctor Strauss of Virginia and Doctor Howell of Illinois say, *"The stray dog is the real menace. It is the business of the city to rid itself of its strays."*

Annual Vaccination of Dogs.—Judiciously employed, this measure is an effective aid in curbing the spread of the disease. The fact that a neighboring community may make no attempt to eradicate rabies precludes the control of rabies in nearby communities by merely removing the stray dogs from the street. Therefore, it is necessary to increase the resistance of the locally-owned dog population by vaccination. To illustrate what can be done by combining the strenuous activity of the dog pound and compulsory vaccination of all privately-owned dogs, the records of Birmingham, Alabama, may be used.

Rabies was so prevalent in that city that over a five-year period one person in every 96 took antirabic vaccine. The number of rabid animals in the city rose from seven in 1923 to 178 in 1934. Yet, by vaccination of 78% of the dog population, and by increasing the pound activities 53%, the number of humans compelled to take treatment was reduced 67% and rabies in dogs was decreased 66%.

It is true that the degree of immunity conferred by anti-rabies vaccine is not effective against massive subdural or intraocular inoculation, but results justify its use. Against natural infection the vaccine, as now made under license by the federal Bureau of Animal Industry, is highly, although of course not 100%, effective. Being a killed product the vaccine is incapable of causing the disease.

Where the animal has been exposed to rabies, a series of six daily injections is advised. There is no known case where vaccination caused the disease in a dog.

* Theoretically this seems sound. However, nothing in the whole recorded experience with rabies in Europe and the United States substantiates it. In these regions rabies has always disappeared spontaneously from any species other than the dog if it be not reinoculated by the latter species.—EDITOR.

Enforcement of Licensing, Muzzling, and Quarantine Regulations.—This is important in the control of rabies. Proof may be seen in the following table showing the number of people in New York City bitten by restrained and unrestrained dogs.

	1933		1934	
Leashed and muzzled	33	0.2%	56	0.3%
Muzzled only ..	178	1.0%	236	1.2%
Leashed only ..	1669	9.5%	1865	9.6%
Neither leashed nor muzzled..	15682	89.3%	17286	88.9%
Total	17562	100.0%	19443	100.0%

Dogs should be licensed. The responsibility for bites should be placed upon the owner of the dog that does the biting. In any event, a city should be fully compensated for its financial outlay in preventing human and canine rabies. Indianapolis has two types of dog licenses: if vaccinated against rabies, the dog is permitted to run at large; if not, it must be kept on the premises of the owner or held by a leash.

Quarantine measures that may be adopted are both national and local. As previously indicated, England, Ireland, Sweden, Hawaii and Australia are not troubled by rabies. Each of these countries requires a period of quarantine for incoming dogs ranging from four to six months. Since 1919, 12 dogs have developed rabies while undergoing such quarantine. England has had no cases of rabies for more than 30 years, except cases due to the violation of the provisions of the six months' quarantine which it imposes on imported dogs.

Communities do not have a standard quarantine period for dogs which have bitten people. The period varies from 10 days in dogs with very little chance of exposure, to 90 days for dogs which might have been exposed to rabies.

Education of the Public.—This measure, as in all diseases of interest from a public health viewpoint, requires that the public know what to do when rabies problems arise. Children should be taught not to approach stray animals and adults should know the measures to be taken when a person is bitten. Whenever possible, the dog should be taken into custody by a person in authority and not killed (as often happens).

Treatments for rabies have been astonishing and absurd, comical and cruel. Some such theories have been tenaciously maintained and defended even to modern times. Especially did the therapy and prophylaxis of the disease mobilize the minds of physicians and priests, magicians and charlatans. Nothing seemed too revolting to be inflicted on the unfortunate victims of the disease. A translation from Celsus reads as follows:

> The only remedy is to throw the patient unexpectedly into a pond, and if he has not a knowledge of swimming, to allow him to sink, in order that he may drink, and to raise and again depress him, so that, unwillingly, he may be satiated with water; for thus at the same time both the thirst and dread of water are removed.

Another ancient treatment consisted of enlarging the wound inflicted by the rabid animal, packing it with gunpowder, and then igniting the explosive. Celsus also mentions a painful operation which was performed on dogs, which was certain to render the animal resistant to rabies. This myth revolved about the idea that there was a worm under the tongue of every dog. This so-called worm was confused with a loose fold of membrane called the frenum, which acts as a bridle for the tongue. This idea persisted until late in the 19th century, and it was quite the custom for kennel owners to have their dogs "wormed" to prevent rabies.*

People may scoff at these ridiculous ideas prevalent long ago, yet in the present age of science and invention, a great many superstitious ideas concerning rabies still prevail. Many people still think this disease is most dangerous during "dog days"; some contend rabies is due to infected teeth.

* Fire and water, cock's brains and dog's livers, worship at St. Hubert's Shrine, have all been part of the superstitious attempts at treatment. Merillat and Campbell's Veterinary Military History of the United States says (p. 96): In 1811 the New York legislature appropriated $1000 to pay one John M. Crous for a rabies cure and received the following prescription:

"1st. Take one ounce of the jaw-bone of a dog, burned and pulverized, or pounded to fine dust.

"2nd. Take the false tongue of a newly foaled colt; let that be also dried and pulverized; and

"3rd. Take one scruple of the verdigrise which is raised on the surface of old copper by lying in moist earth; the coppers of George I. or II. are the purest and best. . . ."

■ In 1850, Youatt recommended cauterization of bite wounds with silver nitrate to prevent infection. In 1882, Pasteur developed his classic prophylactic treatment. This treatment, with various modifications, has now been adopted by the medical profession throughout the world. The questions that arise are:

1. Who should take the Pasteur treatment?
2. Is the treatment efficacious?
3. Is there any danger associated with the treatment?

Who should take the Pasteur treatment?—All persons bitten by a dog should take the treatment if rabies prevails in the community, unless a veterinarian who has an opportunity to examine the dog while yet alive, is in a position to state positively that it does not have rabies. If the dog dies or is killed in less than 14 days without such an examination, or if the dog is unknown or disappears, the treatment should be taken. However, if the dog is known, is observed promptly and shows no disturbance, and if no rabies has been present in the region for six months, treatment is not necessary. Even so, the dog should be kept under the observation of a veterinarian for 14 days.

Is the treatment efficacious?—All indications point to very good results from treatment. Once symptoms are evident, treatment is useless. The Pasteur treatment is valuable only as a prophylactic measure. As previously mentioned, the Pasteur Institute in Paris reported 16% mortality in untreated persons. In treated persons, the institute reports no mortality if the treatment be started promptly after the bite. However, others giving the treatment report the following percentages of mortality:

	Persons Treated	Deaths	Percentage of Mortality
1928	31,656	60	.49%
1929	69,707	333	.48%
1930	69,541	162	.23%
1931	119,433	574	.48%
1932	115,859	439	.38%
1933	118,062	408	.35%
1934	110,884	335	.30%
Total	635,142	2,411	.38%

The usual cause of death in those treated is delay in starting the series of injections. Some people are incapable of acquiring the necessary immunity. The highest degree of immunity is usually reached about five weeks after completion of the treatment; and after six to nine months, all acquired immunity is lost.

Is there any danger associated with the treatment? Unfortunately, there are sometimes serious results or complications to the antirabic treatment. The Pasteur treatment should not be given carelessly or indiscriminately for that reason. The most common complication is a form of paralysis. Of 107,912 cases treated, 210 cases of paralysis were reported. These conditions of paralysis were cases of a laboratory hydrophobia caused by a fixed virus rather than a street virus. Mortality ranges from 5 to 30% and recovery is complete in a few weeks.

The incidence of such paralysis is lower in children than in adults. This is definitely not rabies. The incubation period is much shorter than that of rabies. Paralysis starts, in the majority of cases, from the 11th to the 30th day after being bitten. Its occurrence is influenced by the method of treatment used, the intensity of treatment, the number of transplants the fixed virus is submitted to (should not be passed through more than 300 rabbits), and the quantity of foreign nervous substance inoculated. Recovery is sometimes slow and the sickness may leave sequellæ. The phenolated and etherized vaccines (especially the dead phenolated vaccines) cause fewest cases of paralysis.

The various vaccines used are:

1. Dried or glycerinated cords (Pasteur's original and Calmette).
2. Live phenolated vaccine (Puntonis).
3. Dead phenolated vaccine (Semple modification).
4. Modified diluted vaccine (Högyes).
5. Fermis' original method (sero vaccine).
6. Heated vaccine (Babes).
7. Etherized vaccine (Hempt)—not commonly used.

Seborrhea in a Greyhound

Seborrhea is a functional disease of the sebaceous glands, characterized by an excessive secretion of an altered character which forms an oil coating, crusts, or scales on the skin. It is especially liable to occur in animals which are in subnormal condition, particularly in the anemic and chlorotic. Severe infectious diseases and digestive disorders may act as predisposing factors. It tends to lessen in intensity or disappear as normal health is restored.

A fawn, six years old, pure-bred, male greyhound, imported for racing was presented to the Kansas State College veterinary clinic last October with the history that for two weeks the dog had been showing a progressively worse skin and general condition.

Symptoms: The hound was greatly debilitated, poor in flesh and had a temperature of 104.2°F. The coat was lusterless; the skin was covered with bran like scabs, and masses of fatty material surrounding the bases of the hairs welded them into clumps. In grooming, the scales came away, together with numerous clumps of hair, which were greasy to the touch and had a peculiar rancid odor. Small bald patches began to appear and very slowly increased in size. The inner surface of the ears showed a profuse grayish exudation.

Urinalysis revealed nothing of pathological significance. A blood count showed a slight increase in white blood cells; the white elements being in a normal proportion, however. A fecal examination revealed a heavy infestation with hook worms.

After several days of treatment, the seborrheic condition began to subside, but at the same time eczematous-like lesions began to appear. The bald patches on the back and forehead were mainly affected. The affected areas of the skin which were somewhat ill-defined, became reddish in color and formed small pustules that became covered with crusts. The condition responded very slowly to treatment. A skin scraping revealed nothing of significance.

Diagnosis: Seborrhea may resemble and be mistaken for eczema. In the former itching is often intermittant and is rarely intense as in the latter. Seborrhea usually appears uniformly and although it and eczema differ in many respects they may coexist. The one affection may predispose to the other.

Treatment: Medication was tentative and changed if unsuccessful, or when no further benefit was noticeable.

The dog was fed meat three times a day in limited amounts and dog biscuits with one of his meals.

The first day 10cc of forgan, which has a stimulative action on the skin, was given subcutaneously followed by four 5cc doses at five or six day intervals.

The second day as an alterative 10cc of sodium iodide was given intravenously. At the same time 2cc of tetrachlorethylene was administered per os, to expel the hook worms. Two additional treatments of tetrachlorethylene were given, eight days apart. A 20% solution of tannic and salcylic acid in alcohol was applied to the moist and raw areas daily to dry them up.

The sixth day one dram of shark liver oil, which is rich in vitamins A and D, was given and continued daily during treatment.

Beginning with the 14th day and continuing for five days a light coat of 1% rotenone and olive oil was applied as a dressing to soften the skin.

The 19th day 5cc of iron arsenic and phosphorus, as an alterative, was given intravenously, and following that two-grain doses of iron arsenate were given per os daily for five days.

The 27th day 5cc of liver extract was given intramuscularly. Lassar's paste, which removed the scabs and softened the skin, was applied on the skin lesions in place of the alcoholic preparation.

The 28th day an alterative, two grains of triple arsenate tablets with nuclein, was administered and continued daily during the remainder of the treatment. The 43rd day 5cc of liver extract was again given.

After 61 days of treatment the dog left the hospital in a normal condition.

A. L. HAVLICK
Manhattan, Kans. K.S.C., '39

Canine Pediatrics

X. Clinical Observations as an Index of Progress of Artificially Fed Puppies*

By D. M. CAMPBELL, Chicago, Illinois

IMPORTANT data regarding the progress and physiological condition of very young puppies fed on simulated bitch's milk can be obtained from a number of standard observations, clinical in nature, which form a useful routine in the practice of canine pediatrics.

The research program described in this series of articles involved not only detailed consideration of the chemical constitutions, the biological characters, and the appropriate balances of the various components of the dietary for the artificially-fed puppy, but also, a series of observations on the reaction of the individual puppy which too often are overlooked or considered to be of little or no importance in the routine or commercial raising of young pups—both those left with the mother and those fed artificially.

These observations, which it was necessary to correlate with the particular characteristics of any given formula, feeding regimen, and other practices, proved to have a significance and value that make consistent attention to them in the feeding of puppies of great importance. A day to day knowledge of the progress of an artificially-fed pup, detection of incompatibility of foods irrespective of cause, evidence of digestive disturbances as interpreted from the condition of the feces and the frequency of evacuation, are all data which must be recognized as obviously necessary for an adequate understanding of those several fundamentals which enter into the broad problem of artificial raising of very young puppies.

Such observations, properly interpreted, and correlated with the dietary, essentially represent a basis of diagnosis. Since proper diagnosis precedes interpretation and the application of proper corrective measures, it is obvious that the nature of the observations, which for convenience we shall designate as "clinical observations," is such that they serve as a valuable guide in the feeding of puppies irrespective of age and irrespective of the compatibility of the particular formula employed.

THE simplest observation to be made and recorded, and at the same time one of the most valuable, is the daily weighing of the individual puppies. Stationary weight, loss of weight, or gain in weight immediately offers an index to the character of the pup's progress and development and also serves as a most reliable indirect criterion of the comparative metabolic response of the individual to a particular food.

A steady gain in weight, concurrent with a normal fecal condition, means healthy development. Stationary weight with no obvious abnormalities of the fecal condition or frequency of defecation indicates a marginal or subnormal metabolism and inadequate nutrition either because of incompatibility of the food or because of some abnormality in digestive and metabolic processes. Stationary or declining weight with an obvious abnormal condition of the feces indicates an acute or insidious dietary disbalance with markedly impaired digestive functions or the onset, or even the establishment, of gastrointestinal infections. Such infections may have been induced by the subnormal character of the digestive processes resulting from an improper dietary or by a satisfactory dietary formula im-

*Prepared in collaboration with Dr. G. C. Supplee and Mr. J. H. Le Ware, Borden Research Laboratories, Bainbridge, N. Y. This is the tenth article in a series on the nutrition of young puppies. The eleventh installment of this discussion will appear in an early issue.

properly managed through overfeeding or too frequent feeding. Prompt recognition and proper interpretation of these various observations, which do not necessarily call for skilled diagnostic experience or training, permit the application of early corrective measures and prompt recovery or reëstablishment of normal development of the puppy.

Pups left with the bitch may, in many instances, double their birth weight within 10 days, providing the bitch is in prime condition with adequate milk flow of optimum nutritive character. However, in a large number of instances this rate of gain is not realized. The vigor and development of different puppies in any litter are rarely the same. Some of the puppies of a litter may be undernourished because of lack of aggressiveness and vigor necessary to obtain their reasonable share of milk or because the bitch's milk, although flowing abundantly enough for all, may be impoverished in certain vital nutritive factors as a result of inadequate diet. And there are, of course, other considerations owing to which the ideal or optimum rate of growth of puppies on the bitch is not applicable to the individual pup. Therefore, this rapid rate of weight increase whereby the puppy doubles its birth weight in 10 days should not be expected in the artificial feeding of very young puppies; nor is it desirable even in puppies reared by the bitch. The hazard entailed by so feeding the sow at farrowing time that the pigs make a rapid gain immediately after birth is well recognized by all experienced veterinarians. It is safer in all species to allow the young some time to become adjusted to the abrupt change in nourishment, that takes place at birth, before forcing the newly functioning digestive organs to work at their full capacity. Experience has indicated that in the great majority of instances, with most breeds studied, such rapid rate of gain should not be permitted for puppies fed on the simulated bitch's milk, because of the desirability of the previously explained, lower caloric intake during the two weeks adjustment period required to establish full and complete compatibility. By the end of four, five or six weeks, however, after compatibility has been established, and the increased caloric level of formula feedings is fully and efficiently metabolized, the artificially fed puppy usually progresses as well as the suckling, and as data presented previously have shown, often shows progress better than that of the nursing pup.

Pal

MERE gain in weight of either the suckling or the artificially-fed puppy is not necessarily an adequate criterion of proper growth and development. It has been observed, especially in the case of small litters, that the suckling pup to which an abundance of bitch's milk of good nutritive quality may be available very frequently "puts on weight" in the form of excessive soft fat with a consequent lack of development of muscular tissue. Such an overfed pup may be healthy but it is not necessarily normal. It frequently happens that puppies carry such excessive fat and consequent concurrent subnormal muscular development that adequate exercise during the suckling period and especially at the time of normal weaning, is impossible. Almost invariably such overweight pups suffer a reaction sooner or later which involves more or less rapid decline in weight, retardation in development, and frequently a dietary upset, irrespective of the compatibility of the formula and rigid management of the

feeding regimen and schedule. Therefore, no concern is warranted as to the progress of the artificially-fed puppy if the rate gain does not parallel that of the maximum which the pup conceivably might attain from its mother's milk. It cannot be emphasized too strongly that, as stated in previous articles, the ideal rate of development for the artificially-fed pup is a constant or substantially uniform rate of gain from day to day or period to period, but without excessive "putting on of weight." When growth and development are progressing satisfactorily and are accompanied by normal fecal conditions, no attempt should be made to accelerate growth by feeding excessive amounts of the artificial formula. Rapid or excessive changes in the prescribed concentrations of the formula, or any additions or modifications of the formula, may lead to complications. A standard simulated bitch's milk has been balanced properly and compounded by the manufacturer to meet the puppy's exact nutritive requirements when fed under the recommended regimen, which in turn is planned to prevent undernourishment and at the same time forestall the inevitable complications which arise from overfeeding. Although reiteration of caution against overfeeding of very young pups may seem superfluous and repetitious, the importance of avoiding this common tendency and the inevitable complications which arise as a result of its extended practice is well emphasized by the generally accepted fact that even adult and mature dogs are easily thrown into dietary disturbance and dysfunction by overfeeding. If the avoidance of overfeeding of the adult dog is to be accepted as axiomatic, it becomes apparent that the avoidance of a similar abuse in the artificial feeding of very young puppies becomes an absolute necessity.

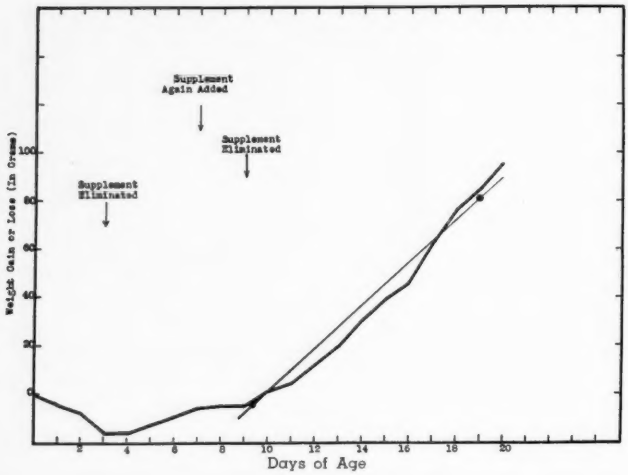


CHART XXII

Typical negative results to be expected from introduction of extraneous substances into the very young puppy's dietary by way of additions to, or supplementing of, the already carefully-balanced simulated bitch's milk, are shown in this chart. Each time the supplement was added to the formula the puppy's progress was retarded, and each time the supplement was eliminated the puppy made good progress on the unadulterated simulated bitch's milk.

CHART XXII shows graphically characteristic disappointing results obtained from efforts to accelerate the growth rate by additions to an entirely satisfactory simulated bitch's milk formula. The simulated bitch's milk used as a basis of experimentation on this particular puppy had given eminent satisfaction in all cases in which it had been tested. It was desired to determine whether further acceleration of growth rate could be induced in a very young puppy by slight modification of the formula by additions of concentrates carrying vitamins which in themselves are necessary for growth and the maintenance of normal well-being. From an abstract theoretical point of view the introduction of such excesses of vitamin material should have induced a greater rate of growth.

However, because of the incompatible nature of the impurities and the extraneous substances accompanying the vitamin-bearing material, the opposite result was manifested. The illustration, typical of the reactions of other puppies from the same litter, emphasizes the adverse effects of introducing substances of an unknown character in the dietary of very young puppies.

During the first three days while the modified formula was being fed there was a consistent and relatively rapid decline in weight. The supplement was omitted after the third day with consequent leveling of the weight and resumption of growth. The same supplement was again added on the seventh day and during the seventh and eighth days the growth rate again became level. Following the discontinuance of the supplement on the ninth day and thereafter growth rate progressed satisfactorily and uniformly.

This instance affords a concrete example of the failure of a well-intended motive to further enhance the nutritive balance and character of a previously-proved satisfactory formula. The small amount of supplement added was entirely insignificant in terms of quantity but it was of such a character, however, that its presence threw into complete chaos and disorder the established metabolic balance and compatibility with consequent results recorded in the graph. These unfavorable results were manifested in spite of the fact that appropriate caloric intake and feeding regimen were maintained in accordance with a practice previously proved to be a correct one.

YOUNG puppies, artificially-fed and completely separated from their mothers, generally tend to lose weight during the night, or if actual loss of weight does not occur, the gain in weight is less than during the daytime. This observation has been recorded on hundreds of pups including those making mediocre progress, the most vigorous, and sick and distressed puppies. Studied attempts to determine the cause of this phenomenon have not elicited an entirely adequate explanation. It has been suggested that fluctuations or inherent differences in humidity might be the primary contributing cause. It was determined that variations in temperature alone do not explain the phenomenon. Numerous pups maintained in incubators with constant temperature, although without humidity control, manifested the same variations as those which were not subjected to the controlled uniform temperatures throughout the 24-hour period. The practical significance of this circumstance is that the daily weighing of puppies should be scheduled for the same time of day in each 24-hour period. The net change at 24-hour intervals is the only reliable evidence as to weight upon which interpretation or diagnosis of the individual puppy's progress can be based.

DAILY observations of the condition of the feces are of as great or greater importance than observations of weight. In correlation, the two observations are of fundamental significance. Under normal conditions a puppy's feces are brown in color, and reasonably firm, or at least "formed." They are evacuated with little effort and leave the anus clean and dry. Such a fecal condition is a dependable criterion in judging the state of nutrition and the relative degree of efficiency and satisfactory nature of the digestive and metabolic processes as a whole. Normal feces furthermore clearly indicate proper intestinal function and proper colonic reflexes and functioning of the intestinal musculature.

Disbalances of fat, carbohydrate, protein, or minerals characteristically are followed by a more or less regular sequence of changes in the color and physical character of the feces. In brief, the frequency, color and physical character of the feces, are extremely reliable and important indexes for judging compatibility, digestibility and the appropriateness of a formula, and also the puppy's ability to assimilate it properly. One of the first indications of an incompatible diet is a change in the color of the fecal discharge; progressing from the normal brown and a semi-formed condition to a light brown, less formed in character, and

then to a discharge of greenish cast and greater fluidity. The intensity of the green color may diminish to a light green, to a dirty grey and finally to a dirty white. The latter condition usually indicates the evacuation of undigested food. (Such light-colored or dirty-white feces, however, should not be confused with the foul-smelling, mucous-colored evacuations frequently encountered as a result of worm infestation.) These abnormal conditions of the dejecta parallel a breakdown in the muscular tone of the colon and of the entire intestinal tract with consequent faulty ejections of the fecal matter. In extreme cases evacuation as a voluntary process virtually ceases and fluid feces appear to run from the anus more or less continuously and without apparent control. The foul anus and rear quarters of a pup in this condition obviously present problems of daily care and appropriate hygiene, in addition to the corrective dietary measures necessary if the puppy is to be saved.

These, or similar, conditions of the fecal matter may result not only from an incompatible formula, but also from over-feeding of a highly compatible and satisfactory formula and, in some instances, underfeeding may cause similar results. However, this condition, prevailing as a result of underfeeding, as a rule, only follows a period of continuous loss of weight readily detected from the daily weighings; which fact emphasizes the value of simultaneous observation and interpretation of both fecal and weight changes, and their correlated evaluation.

Loose and abnormal stool condition resulting from worm infestation, very common in young puppies when improper care has been taken of the bitch prior to whelping, is identified readily by the usual microscopic examination of feces for the detection of eggs and cysts. This diagnostic procedure is familiar to all veterinarians and it has no direct relationship to nutritional problems. The condition calls, of course, for appropriate measures directed against the parasitism and not, in this instance, an attempt to correct the feed condition by a modification of the ration.

DESPITE rigid application of the proper feeding schedules and regimen, and the use of a compatible dietary—all designed primarily to prevent occurrence of abnormal conditions such as those under discussion—irregularities in growth rate and the condition of the fecal matter are bound to appear on occasion, necessitating practical corrective measures. During the course of the extended research project in which a simulated bitch's milk was developed, Borden research workers found certain of such corrective measures, aside from the broad matter of correct dietary and its administation, highly efficacious and applicable to routine cases.

The use of milk of magnesia proved especially beneficial in cases of abnormal fecal conditions properly interpreted as resulting from upsets traceable to the dietary regimen. A dose of about ½ teaspoonful of milk of magnesia for the very young puppy, followed by a small amount of sterile water administered at one of the regular feeding periods and in the place of the regular scheduled formula feeding, proved to be a suitable mild agent for the proper cleansing of the intestinal tract and elimination of the objectionable accumulation. For puppies four to five weeks old and for younger puppies of the larger breeds, larger quantities of the milk of magnesia may be given. One dose may prove adequate as a corrective in mild conditions, and food may be offered at the following scheduled feeding period at the end of the regular 8-hour interval. It is advisable, although not essential, to reduce the amount of food ingested at the succeeding one or two feedings.

Although castor oil, thorough and quick in action, generally is recognized as the cathartic of choice, experience has proved that this agent for cleansing the intestinal tract is too severe for very young puppies. Intestinal injuries of an irreparable character have been traced directly to the use of castor oil as a corrective for puppies of very young age. In addition to the mildness of its action, milk of magnesia has a further advantage in that its antacid character alleviates any abnormal acid condition of the intestinal content. The introduction

into the intestines of a neutral or mildly alkaline medium is most appropriate, in contradistinction to an acid medium, for facilitating the digestive action of pancreatic enzymes.

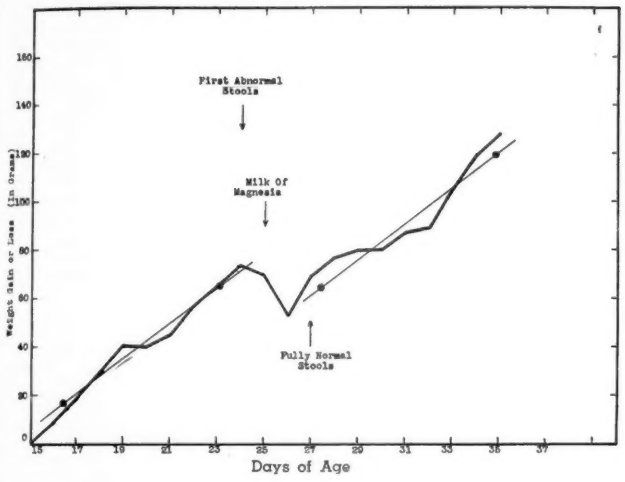


CHART XXIII

This growth curve shows how prompt detection of physiological dysfunctioning, through recognition of abnormal stools even before condition was reflected in weight change, and speedy therapeutic measures corrected the condition and within two days returned the puppy to a course of healthy growth, with all symptoms eliminated.

Very frequently sodium bicarbonate in small doses and in low concentration may be used instead of the milk of magnesia, but in the majority of cases it has not proved as satisfactory as the milk of magnesia. However, occasional doses of sodium bicarbonate fed with the artificial milk or with water preceding the feeding of the formula may serve to overcome temporarily any slightly excess acidity and concurrently correct what is essentially a mild attack of indigestion. The practice of feeding sodium bicarbonate should not be resorted to at frequent intervals nor should it become prolonged.

The use of apple powder is another therapeutic measure which has proved efficacious in certain diarrheal conditions. The observations and experiences accrued during the course of this puppy feeding research project have shown, that in numerous instances, apple powder superimposed upon the formula at the regular feeding periods, to an extent not exceeding 4% to 6%, during a four- to five-day period is frequently highly beneficial. The effect of the apple powder is probably due, primarily, to the mechanical cleansing effect to which have been attributed the beneficial results of this and similar pectin-containing products used for the same purpose in the treatment of humans. Various detailed, technical evidence, now available, seems to indicate that certain constituents of apple powder also have the ability to prevent, alleviate, and correct certain irritations of the intestinal mucosa. An extended discussion of the probable mechanics or clinical merits of apple powder is not within the scope of this article, but it should be noted that the continued use of apple powder as a component of simulated bitch's milk did not prove to be an effective prophylactic in preventing the recurrence of various digestive and intestinal disorders.

The effectiveness of milk of magnesia as a practical remedial expedient for correcting digestive disturbances is illustrated in Chart XXIII. The particular puppy involved had progressed satisfactorily on artificial feedings until, for reasons not apparent in the case history, abnormally soft feces, with accompanying loss of weight, were noted on the 24th day. The physical condition and reactions of the pup further indicated a "sick dog". Previous experience had indicated that such a condition, promptly detected, can be promptly remedied. Accordingly, a dose of milk of magnesia

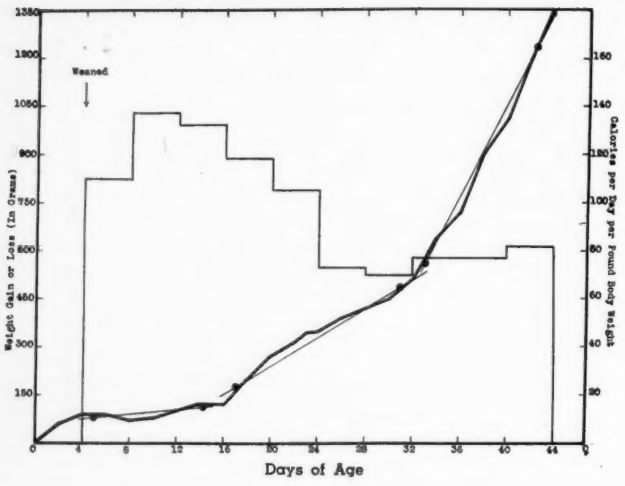


CHART XXIV

Value of correlation of data obtained from clinical observations (daily weight changes, etc.) with record of feeding regimen, as dual index to suitability of feeding levels and progress of the puppy, is illustrated above. Excessive feeding, as shown in area graph, coincided with poor growth, reflected in curve, and with abnormal stools described in text. Correction of over-feeding was reflected in improved growth and normal stools.

of the size recommended in the foregoing was administered. One complete feeding was withheld after the dose of milk of magnesia; that is the puppy missed two feeding periods; at the first the milk of magnesia was given, at the second nothing. During the following 24-hour period further marked loss of weight occurred. Since the puppy received only 1/3 of the scheduled amount of formula on the day of the treatment, the reduced caloric intake undoubtedly accounted in part for the marked loss of weight during the second 24-hour period. During the succeeding 24-hour period, however, weight gain was resumed, fecal conditions promptly returned to normal, and the progress of the puppy thereafter proceeded satisfactorily and with fair degree of uniformity. This case is cited in detail to illustrate the necessity for (1) prompt recognition of abnormal conditions both as to weight and feces, and (2) prompt remedial measures. Failure either to observe the condition at its onset or to administer milk of magnesia and to temporarily reduce food intake undoubtedly would have resulted in the death of the puppy.

THE adverse results which accrue from over-feeding have been referred to repeatedly in this and previous articles. A typical example is shown graphically in Chart XXIV. The puppy was weaned four days after birth to a compatible simulated bitch's milk formula. For the first 12 days after weaning the puppy was fed at an abnormally high caloric level, in excess of 120 calories per day per pound of body weight, as indicated in the area graph accompanying the growth curve. During this period, as shown in the growth curve, the puppy made little or no progress, and the fecal condition, although it had not progressed to the acute stages previously described, nevertheless was obviously abnormal. The intestinal discharges were not especially loose, but were unduly frequent, ranging in color from yellow to light green.

Beginning after the 16th day from birth the caloric level was lowered progressively. The growth curve showed an immediate response in improved rate of gain, and concurrently, the fecal conditions improved and finally became normal with total elimination of the insidious abnormal conditions observed during the period of excessive feeding. From the 16th to the 32nd days, the period during which the caloric intake was being lowered gradually from 130 to 70 to 80 calories per day per pound of body weight, the growth rate was maintained uniformly, but not at a high rate. After the caloric intake had been finally adjusted at 70 to 80 calories per day per

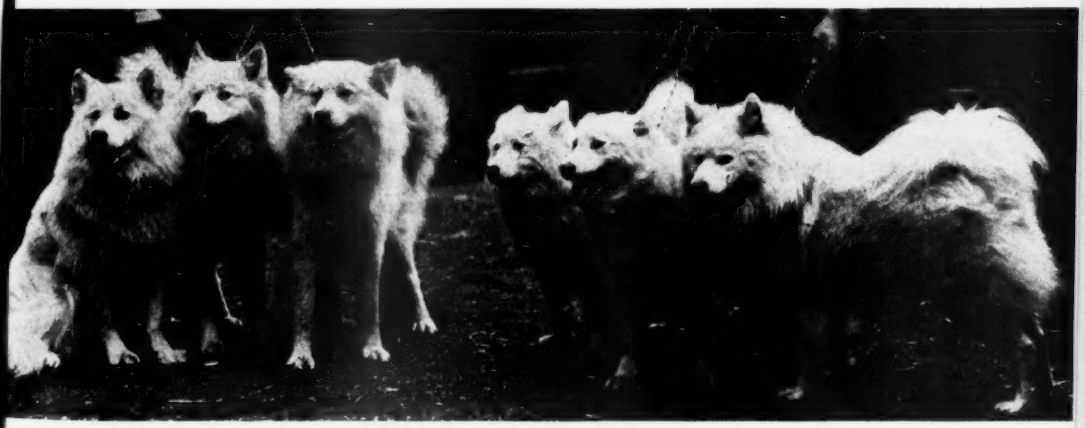
pound of body weight, an amount definitely within the previously-proved optimum range, growth rate increased rapidly from the 32nd day and thereafter, and stool conditions continued consistently normal.

THE reactions illustrated in the chart embody the clinical observations, so far described, and demonstrate the desirability of (1) complete correlation of a controlled and recorded feeding regimen, (2) knowledge of the progress of the development of the artificially-fed puppy in terms of weight and growth gain, and (3) observation and interpretation of condition of the feces. In this case these clinical observations supplemented and confirmed the diagnosis, that this particular puppy, although receiving a highly satisfactory simulated bitch's milk, nevertheless failed to grow because of over-feeding. The diagnosis subsequently was confirmed further by the fact that gradual reduction of the caloric intake and its maintenance thereafter at suitable levels, resulted in improved growth rate, good physical development, and correction of the abnormal fecal discharges.

In addition to weight and fecal observations, indices of the young puppy's health are to be found in skin and fur conditions. The turgidity and elasticity of the skin may be tested by simply pulling it out with the thumb and forefinger. If the pup is in good condition the skin will snap back quickly. If the skin remains pinched up or goes back into place slowly, it usually is a sign of dehydration and subnormal health.

Glossy, silky fur, of fine texture, clean and well-ordered, is characteristic of the well-nourished, thriving pup. As the observer runs his hand over the coat the warmth of the healthy animal is felt through the fine fur. The hair of the undeveloped, ailing puppy, however, usually is coarse, matted and straggly. In brief, the layman as well as the skilled veterinarian distinctly recognizes the healthy, well-conditioned fur and skin of the normal animal in contradistinction to the equally easily-recognized coat and skin conditions characteristic of ill-health, emaciation, and improper nourishment.

In the next article in this series practical questions of care and housing of artificially-fed puppies, reared without the usual attention from the bitch, will be discussed. Practices which have been found useful in managing environmental factors of puppies fed on simulated bitch's milk will be described. Also, observations regarding the exceptionally high intelligence level manifested by artificially-raised puppies will be recorded.



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Abstracts

Spreading Peritonitis in the Dog Treated with Prontosil

The authors[15] developed an unfailing technique (ligature of the cecum with a two-ounce dose of castor oil immediately after the operation) which resulted in spreading peritonitis with 100% mortality in 91.7% of the dogs operated upon.

After the outcome of this procedure had been definitely established by the use of a large number of dogs the effect of the administration of 1cc of prontosil per kilogram of body weight at eight-hour intervals was tested in 22 animals. Fifty per cent of the animals recovered. Of the controls, as stated, 91.7% died.

* * * *

Pig Breeding and Bacon in Denmark

The word "Danish" has, for many years, become a household word as indicating good bacon, and deservedly so, because of its good quality, proportion of lean to fat in the requisite places, fine texture, and flavor.[16] Great Britain obtains 63% of its imported bacon from Denmark.

The foundation of the Danish bacon industry was laid by the Royal Veterinary and Agricultural College when it undertook the improvement of the old Landrace hog. With this superior type of bacon hog and a ration of chiefly separated milk and barley checked for its nutritious qualities by the college research laboratories, the Danish farmer through his coöperative bacon associations is able to produce and market the highest quality of bacon in the world at a price lower than the cost of production of an inferior product in most other countries. The processing of bacon hogs and the grading of the product for export is under strict control of veterinary officers employed by the government.

[15] Bower, John O., J. C. Burns, and H. A. Mengle, 1938. Prontosil and the Treatment of Spreading Peritonitis in Dogs. *The Jnl. of Lab. and Clin. Med.*, 24:3, pp. 240-244.

[16] Young, Lt.-Col. Dunlop, 1938. Pig Breeding and the Bacon Industry in Denmark. *The Veterinary Journal*, 94:11, pp. 408-416.

Arrest of Heart Action in Pigs

Pallaske[18] considers that death of pigs from sudden arrest of heart action is not caused by any toxic action upon the heart, but results from disturbances in the circulatory system, probably of the tonus of the vasomotor center, and the sympathetic and parasympathetic vasomotor forces. Direct treatment is impractical because the usual cardiacs will only accelerate the fatal termination. Prevention may be accomplished by prophylactic measures, such as hygienic rearing and feeding, and frequent exercise in the open.

* * * *

Navicular Disease in Horses

In cases of chronic podotrochilitis the history discloses that the horse, usually, favors the affected foreleg, and that the lameness increases with the amount of work performed.[19] Upon soft terrain the lameness is slight in the beginning. Riding horses exhibit, usually, an irregular gait, and are prone to stumble. When the horse is at rest it prefers to put the lame foot forward. If the podotrochilitis is unilateral, then the lameness appears when the animal is leaving the stable. When being lunged on soft ground, the leg often appears improved, even to the extent of disappearance of the lameness; but on being lunged to great length, the lameness will reappear more pronounced than ever. If now the horse is given a couple hours of rest and then trotted on hard ground again, the lameness will become more pronounced. When the horse is being trotted in a circle the lameness is more pronounced, when the lame leg is inside. In chronic cases atrophy of the muscles of the shoulder may be present. Pressure with the hoof testers upon the frog and navicular bone, and lateral pressure upon the hoof may cause pain. A correct diagnosis, however, is impossible without anesthetizing the volar nerve. X-ray photography of the hoof is an important aid toward the diagnosis.

[18] Pallaske, G., 1938. Further Investigations Concerning the Etiology of Arrest of Heart Action in Pigs. (Transl. title.) *Tierärztl. Rundschau*, 44:4,53-16; 44:5, 69-72.

[19] Schmal, ..., 1938. Diagnosis and Treatment of Navicular Disease. (Transl. title.) *Tierärztl. Rundschau*, 44:1, 1-4; 44:2, 23-26.

Inflammation of the Cerebellar Peduncle in a Dog

A fox terrier 14 months old exhibited motor disturbances; dextrorotation of the body around its longitudinal axis, lying on its right side when resting, convergent strabismus of the right eye, divergent strabismus of the left eye, right ear erected, dextrorotation of the spinal column, sensitiveness of the neck muscles, contraction of the neck muscles, clonic convulsions of the limbs, psyche not involved.[20] In the intermittent pauses the dog remained lying on its right side, the neck being diverted in opposite direction, the right foreleg kept rotated. Post-mortem examination revealed softening of the brain in the region of the right lateral side of the pons Varolii, the cerebellar peduncle, and of the gray cerebellar substance.

Anesthesia of the Volar Nerves

Anesthesia of the volar nerves for the purpose of diagnosing the seat of lameness is accomplished usually by three practical methods: infiltration anesthesia, surface anesthesia and conduction anesthesia; the latter method is used most commonly.[23]

Conduction anesthesia of the volar nerves is usually brought about by the following methods: injection around the nerves in the region of the middle of the metacarpus, the blockade of the nerve at either side of the fetlock in the region of the sesamoid bone, anesthesia below the fetlock, and finally injection around the posterior branches of the volar nerves.

Injection around the posterior branches of the volar nerves anesthetizes the lower half of the hoof and consequently causes disappearance of any lameness situated there. This procedure will allow differentiation of the podotrochilitis from the hoof joint lameness. It makes it also possible to tell whether the podotrochilitis has already affected the hoof joint or not.

[20] Seren, E., 1938. Inflammation of the Cerebellar Peduncle in a Dog. (Transl. Title.) *La Nuova Vet.* 15, pp. 175-184.

[23] Bolz, W. 1938. Anesthesia of the Volar Nerves. (Transl. title). *Wien. Tierärztl. Monatsschr.* 25(17):521-530.

Diagnosis of Lameness in the Horse

The centers for the diagnosis of lameness are found always in the region of the insertion of the tendon and ligament involved, because it is in this region that the bone receives its maximum strain from the exercise.[22] In the initial stage of lameness these regions may be detected by palpation; later on, diagnostic anesthesia and x-ray examination become necessary for an accurate diagnosis. In chronic diseases of the joints the cause of lameness is due to mechanical interference with the movements, because defects of cartilage and atrophy of sections of the bone do not cause lameness. The pathological-anatomical changes of the bone and the joint are caused, as a rule, by a periostitis ossificans. The chronic arthritis is mostly of a periarticular origin.

The Conjunctival Epithelium of Cattle and Sheep

The conjunctiva of cattle and sheep, in the region of the tarsus, is covered by stratified pavement epithelium; in the region of the fornix it is covered by columnar stratified epithelium.[21] In either species the conjunctival epithelium is never covered with a cornified layer of cells. Mucous cells are almost always present; a lymphocytic infiltration of the epithelium is a constant feature. It is very exceptionally that mitosis can be demonstrated in the conjunctival epithelium. In cattle and sheep there is no connection or interrelationship between the thickness and structure of the conjunctival epithelium, the number of the mucous cells, the formation of figures during segmentation of the nucleus, the degree of infiltration of the epithelium, and the estral cycle.

[22] Wittmann, F. 1938. The Centers for the Diagnosis of Lameness of the Anterior Extremity of the Horse. (Transl. title). *Zeitschr. f. Veterinärk.* 50(6):241-274.

[21] Tehver, J., R. Säre, and M. Keerd, 1938. The Conjunctival Epithelium of Cattle and Sheep During Different Phases of the Estrus Cycle. (Transl. title.) *Acta et Commentationes Universitatis Tartuensis* 34, pp. 1-16.

Gall Cultures of Brucella Abortus

Gall cultures of *Brucella abortus* are living vaccines; they should be used only in diseased herds.[27] In these herds those animals only are to be vaccinated which are four months of age and over, up to the second month after the first service. It is assumed that natural infection rarely takes place before the fourth to eighth month. The idea is to give gall cultures before natural infection is apt to take place. Animals in advanced pregnancy should not be vaccinated. The dose is 25 to 50cc. It is given subcutaneously and repeated twice or thrice.

Equine Helminthiasis

Habronemiasis is not characterized by special symptoms.[24] The Habronema species produce nodules in the glandular mucosa of the stomach. The anterior portion of these nematodes is found usually buried in the mucosa. Their activity may produce conditions of weakness and colic-like symptoms of varying intensity. The life cycle of Habronema is indirect, necessitating an intermediate host; the housefly for *H. megastomum*, and the stablefly for *H. microstomum*. The eggs are voided in the feces; the embryonated eggs are ingested by fly-larvæ; in the intestinal tract of the latter the worm larva becomes liberated and goes through the same metamorphosis as the fly larva. Finally the worm larva migrates to the proboscis of the mature fly. Infestation of the horse takes place when the fly lands on the lips of the horse. On contact with the mucosa of the lips the worm larva emerges from the proboscis and crawls with serpentine movements into the mouth cavity, whence it enters the stomach with the saliva. Transmission may also take place on the surface of wounds where the ingestion of the larva is facilitated by licking. Worm larvæ deposited upon the conjunctiva will cause a severe conjunctivitis. Worm larvæ may also enter the lungs by means of the nasal cavities and the respiratory tracts. In the lungs the larvæ cause nodules which possess a tendency to caseate and to calcify.

Acaprin for Piroplasmosis

The piroplasmoses are subdivided into two groups, the Babesioses and the Theilerioses.[25] Babesiosis is characterized by an incubation period varying from a couple of days to three weeks, followed by a sudden fever. Upon microscopical examination of the blood the parasites are found in the red blood corpuscles which they ultimately destroy. Emaciation, hemoglobinemia, and hemoglobinuria result. In severe cases death may take place as soon as 48 hours after the first symptoms appear. In animals which survive the acute attack the clinical symptoms disappear slowly. Recuperation seemingly takes place, but the blood of such animals remains infectious. Evidently a state of equilibrium between the macroörganisms and the microörganisms has taken place. We might designate this state as a labile infection; the French call it premunition. Harmul circumstances from within or without are apt to destroy this equilibrium at any time, resulting in recidivation, and finally causing the death of the animal. Complete immunity has not been observed thus far in Babesioses. In Theileriosis the parasites are not found in the erythrocytes at the onset of the fever. The so-called Koch's plasma spheres, however, may be found in the leucocytes of the spleen and lymph glands. Not until much later do the parasites appear in the blood stream. Characteristic of Theileriosis are the intense swellings of the lymph nodes, especially of the head and neck. Acaprin, which is the proprietary name for an N-N-(bis-methylchinolylium-methylsulfate - 6) urea compound, enables the veterinarian not only to cure an individual animal, but to stamp out piroplasmosis in a herd effectively.

[24] Wagner, O. 1938. Equine Helminthiasis. (Transl. title). *Vet. Med. Nachr.* Aug. 1938; Sonderheft.

[25] Kikuth, W. 1938. Acaprin, a Specific Against Piroplasmoses. (Transl. title). *Vet. Med. Nachr.* Aug. 1938. Sonderheft.

[27] Demnitz, A. 1938. Avirulent Abortus Bang Cultures Obtained by Cultivation on Gall Medium, and Their Possibilities for Immunization. (Transl. title). *Vet. Med. Nachr.* Aug. 1938.

Poliomyelitis in a Heifer

Experimental transmission of poliomyelitis acuta to animals except monkeys had failed until recently. Frauchiger[28] observed symptoms of paralysis in a 1½-year-old heifer during an epidemic of infantile paralysis. The clinical course as well as the histological findings in the heifer corresponded exactly to those observed in human poliomyelitis. Therefore, one has to reckon with the possibility of transmission of this disease from animals to man, especially since several cases of infantile paralysis already have been observed following the ingestion of milk from a sick cow.

Symptoms of Internal Chilling

Calves drinking large amounts of cold milk, and heifers drinking large quantities of cold water, often become chilled internally; this results in paresis and paralysis of the abomasum.[26] The calves seem to become indifferent; they lie down much of the time and sometimes exhibit colicky pains. At the beginning of the ailment the clinical examination gives little clue as to the cause of the illness. It is expedient to have the patient lying on its left side for the examination. The principal symptom is bloating in the region of the abomasum, and a certain amount of pain upon pressure applied to this region. Later in the course of the disease the diagnosis is easier, because splashing noises are heard when the stomach region is palpated. Sometimes dypsnea is found to be present.

Colts drinking excessive amounts of mare's milk often suffer from collection of the fluid masses in the cecum; this causes paresis of the intestines, resulting in toxic symptoms, fever, increased respiration, and often colic. Colic in colts is also frequently caused by eating grass covered with hoary frost. Horses are apt to contract colic from drinking too much cold water, especially when they have been sweating.

In these cases of indigestion, the lack of peristalsis must not be mistaken for constipation.

Alkali Reserve in Heart Ailments

In healthy dogs the alkali reserve parallels the blood pressure.[30] In dogs suffering from a decompensatory heart disease it is found that the alkali reserve is generally lowered. However, during the course of the decompensation great deviations in the CO_2 linkage curve are apt to occur, resulting in very high alkali values at a time when the clinical findings are unfavorable. It is believed that the decrease in alkali reserve during a decompensatory heart disease is due to the decrease in blood pressure.

Spastic Tremor in Calves

In the upper Bern country there occurred during the past years a little known disease, locally designated "spastic tremor" (Zitterkrampf).[29] It assumed epizoötic proportions, especially during spring. The early symptoms are: stiff gait, acute intestinal and respiratory catarrh, sweating. On the second and third day convulsive contractions of the flexors of the anterior extremities occur, complicated with severe muscle tremor. The muscle tremor is noticeable especially when attempts at raising are made, whereby the animals support themselves upon the fore-pasterns and the knees. The cause of this disease could not be ascertained. Transmission experiments, injecting cerebrospinal liquid into the subarachnal space of healthy calves, and subcutaneous inoculation of blood serum did not cause disease in the experimental animals. Likewise the post-mortem examination of calves which had been slaughtered as an emergency measure, and the histological examination of the central nervous system, did not give reliable results. Hexamethylene tetramine, administered internally, influenced favorably the course of the disease.

[28] Frauchiger, E. 1938. Infantile Paralysis in a Heifer. (Transl. title), *Schweiz. Arch. Tierheilk.* 80:70.
[26] Toman, R. Diseases of Domestic Animals Caused by Internal Chilling, (Transl. title), *Tierärztl. Rundschau* 44(19):299-302.
[30] Barke, A. 1938. The Alkali-reserve in Dogs Suffering from Heart Ailments. (Transl. title). *Deutsche Tierärztl. Wchnschr.* 46(15):225-228.
[29] Egli, J. F. Spastic Trembling in Calves. (Transl. title). *Schweiz. Arch. Tierheilk.* 78:235-253.

Book Reviews

AVIAN TUBERCULOSIS INFECTIONS. *By William H. Feldman,* D.V.M., M.S., Associate in Division of Experimental Medicine, Institute of Experimental Medicine; Associate Professor of Comparative Pathology, Mayo Foundation for Medical Education and Research, Graduate School, University of Minnesota. Cloth bound. 483 pages, 109 illustrations. The Williams & Wilkins Company, Baltimore, 1938. $7.00.

This scholarly work is a credit to the author and to the profession he represents. It records a vast amount of research and deep study of the subject on his part and in addition an exhaustive search of the world literature on avian tuberculosis. Actually nearly 1000 references are given to significant publications on the subject since the disease was first recognized 70 years ago. It is a work for the specialist and is far more comprehensive than the average veterinarian requires. None the less there is much in it in which every practitioner of veterinary medicine must have a keen interest; such as:

There are 454 million chickens valued at 200 million dollars in the United States. The monetary value of the poultry industry is nearly two billion dollars annually. Avian tuberculosis costs the poultry industry 12 million dollars annually and the swine industry an equal amount. It occurs on up to 60% of the farms in 10 north central states and scarcely at all in the southeastern states with a light incidence in most of the remaining portions of the country. Although all members of the feathered tribe are susceptible to avian tuberculosis it is strictly a disease of domesticity unable to perpetuate itself among wild fowl which are affected only where they associate with domestic birds. Veterinarians will be interested in the discussion of the susceptibility of other animals and in the author's views as to control and eradication of the disease and of course in his discussion of diagnosis and the many fine illustrations of the lesions it produces.

The work is a complete summary and evaluation, the first, of all known facts about the *Mycobacterium tuberculosis avium* and the infections it causes—a reference tome that will not disappoint the searcher for any sort of information on the subject.

For physicians the most interesting chapter is that on pathogenicity of the avian tubercle bacilli for man, which gives many case histories.

William H. Feldman

VETERINARY HELMINTHOLOGY AND ENTOMOLOGY. *By H. O. Mönnig,* B.A., Dr.Phil., B.V.Sc., Professor of Parasitology, Faculty of Veterinary Science, University of Pretoria; Veterinary Research Officer, Onderstepoort, South Africa. Second edition. Cloth bound. 409 pages, illustrated. William Wood and Company, Baltimore, 1938. $9.00.

This excellent work was reviewed in some detail four years ago (VET. MED. 30:2, pp. 89-90) on the appearance of the first edition. That a new edition should be required in the short space of four years is convincing evidence of its usefulness and justifies the reviewer's opinion at that time that it would receive "a welcome at the hands of veterinary practitioners whose needs it will serve in an acceptable manner."

Few changes have been made in the text and the book has been enlarged only seven pages. Occasional modifications in the treatment recommended, rare additions to life histories, and a very few alterations in nomenclature will justify only the specialist in procuring the new edition if he has the old, but perhaps the swift appearance of a second edition will by reason of the approval it connotes induce veterinarians who did not procure a copy of the first edition to deny themselves no longer the help this text will give them. The au-

thor, however, judged by statements in the preface, regards the revision and the new matter as important. His is the view of the specialist.

As the title indicates the work does not include protozoa, but the discussion of parasitic worms: the flukes, tapeworms, round worms, threadworms, and leeches, includes all species of these parasites of economic importance, and the same applies to the discussion of arthropod parasites—fleas, lice, mites, ticks, warbles, flies, gnats, mosquitoes, etc.

The work is logically arranged for study, and the most conveniently arranged for reference of any text on the subject. The publisher has done his work in a faultless manner, creating a pleasing and serviceable volume.

* * * *

HOW TO RAISE A DOG in the city and in the suburbs. *By James R. Kinney,* V.M.D., Chief Veterinarian Ellin Prince Speyer Hospital, New York City, with Ann Honeycutt. Cloth bound. 274 pages with index; 31 illustrations (which are guaranteed to be anatomically incorrect) by James Thurber. Simon and Schuster, New York. 1938. $2.00.

Fourteen chapters are devoted to presenting the problems that confront dog owners in an entertaining style. Doctor Kinney's work establishes him as the author of the most facetious book on dogs yet written.

Many volumes have appeared on the care of the dog, some of which attempted to be ultra-scientific while others attained new pseudo-scientific standards. Doctor Kinney's presentation of the subject differs from the rest in that he confines his advice to the narrow range of understanding of all dog owners.

The care of the dog, and what to do in minor emergencies, are given in a concise manner— not too much about any one thing to create confusion in the reader's mind. The author has selected his material on first aid with care, and repeats again and again a warning to amateur diagnosticians that amateur treatment cannot be substituted for professional services.

Feeding recommendations include the prudent caution: ". . . before using prepared foods consult a veterinarian about types and brands."

Obviously the author reviewed the existing literature, analyzed the errors and avoided them for the purpose of creating a dog manual which small animal practitioners could recommend to their clients with safety. The result is a rollicking little book of good humor and common sense guaranteed to remove the mistaken idea that raising a dog, particularly in the city, is a serious ordeal. No one contemplating the addition of a dog to the household would hesitate further after one reading of "How to Raise a Dog."—*H. J. Mostyn.*

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VETERINARY OBSTETRICS (Equine and Bovine). *By Dr. Franz Benesch,* Professor of Obstetrics and Director of the Obstetrical Clinic in the Veterinary High School, Vienna. English translation edited by *John G. Wright,* F.R.C.V.S., Professor of Surgery at the Royal Veterinary College, London. Cloth bound. 258 pages, illustrated. William Wood and Company, Baltimore, 1938. $4.75.

A work on obstetrics of large animals could hardly be presented to American veterinarians better sponsored than this one. The author is widely known, having spent several months in this country in 1926, visited a number of our veterinary colleges and large cities and presented a paper that was well received at the Lexington meeting of the A. V. M. A. His niche in the veterinary hall of fame is secure as a result of his introduction of epidural anesthesia, which at once sprang into universal use, not to mention his introduction of the wire saw embryotome, which was at first, and is still to some extent, known as the Benesch saw. The editor of the English edition, while unknown here in connection with obstetrics, is favorably regarded for his research work in anesthetics and anesthesia.

"Veterinary Obstetrics" is a work, moreover, that every veterinarian engaged in general practice will want for its own sake. It is scarcely comparable to Williams (the standard work on the subject in this coun-

try) dealing as it does chiefly with the *art* rather than the *science* of obstetrics. It is compact, concise (only about 250 pages of which more than half are taken up by illustrations) to a high degree, yet adequate for the practitioner well-grounded in embryology, physiology, and anatomy.

The price seems high for a book so small. Probably this is necessitated by the many and elaborate illustrations of every step in the relief of the various dystocias described, but we should not want to dispense with the illustrations at any saving in price.

As is to be expected in a work by Prof. Benesch and edited by the professor of surgery in the Royal Veterinary College of London, the discussion adheres strictly to the surgical level. To quote:

> Modern surgical practice in obstetrics, in contrast to lay interference, is based on two firmly established principles: (1) asepsis and antisepsis . . . and (2) careful inquiry into the history together with a careful examination of the patient to determine the exact state of affairs in every case, and consideration as to the most favorable interference for the welfare of both dam and fetus.
>
> Anyone who conducts a case of parturition without regard to asepsis and without a careful consideration of the requirements, who infringes the fundamental principles of surgery, which by their very nature cannot be the subject of variable opinion, is guilty of malpractice, and is, at least, morally culpable.

With this excellent start the author stops short of urging that surgeries be used for obstetric operations. With automobile trailers on most farms and available to every veterinarian, there can seldom be an excuse for attempting to carry out these "firmly established principles" in a drafty, filthy barn by the light of a smoky lantern with the temperature near zero. Veterinarians' clients usually regard them as expendable, it is true, but the expenditure is too rapid when working "stripped to the waist" under such circumstances, nor is the type of surgery possible that the author states is necessary. If European veterinarians have not adopted the common American custom of having cases of dystocia in mares, cows, and sows brought to their places of business, even if it be only into a floored, heated garage, for operation, their obstetric practice must be considerably behind ours in an important fundamental measure. Nor will American veterinarians likely agree that traction "by five powerful assistants" is force under control while traction by mechanical aids is contraindicated because it "is absolutely uncontrolled"; quite the reverse is the lesson of experience. However, the author stresses that strong traction is required only for cases where the fetus is too large for the natural expulsive forces to force through the birth canal. Dystocia due to mal-posture is to be relieved by skill, not force, and the same applies to dystocias from malformation of the fetus or maternal pelvis.

Naturally, the use of anesthetics is dwelt upon. Instrumentation receives much, but probably not undue consideration. It is a book that can be recommended unreservedly, alike to the experienced and the inexperienced veterinary obstetrician.

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A SYNOPSIS OF PHYSIOLOGY. *By A. Rendle Short,* B.Sc., M.D., F.R.C.S., Professor of Surgery, University of Bristol; late Examiner for the Primary F.R.C.S., and *C. L. G. Pratt,* M.A., M.Sc., M.D., Demonstrator in Physiology, University of Oxford. Third Edition. Cloth bound. 325 pages, illustrated. William Wood and Company, Baltimore, 1938. $3.50.

As the title indicates, this little book is in outline form. It is of the type used by students for "boning" for examination, and useful, too, to judge by the need for a third edition within 11 years from the publication of the first. It is intended to be used in conjunction with an ordinary textbook on the subject or attendance upon a course of lectures. The authors state the object of the book is "to give a fairly full summary of modern physiology, particularly human physiology, in a small compass." Practitioners who wish to keep abreast of modern physiology will find here the means of making a quick survey.

* * * *

The common North American chigger has a new name. *Trombicula alfreddugesi* is the proper scientific name now.